MOTOR AGE

Vol. XXXII
No. 9

CHICAGO, AUGUST 30, 1917

Ten cents a copy
Three dollars a year

Cheaper cars now cost as much as the Hudson

With other makes of cars advancing $100 to $400, it is easier than ever for Hudson dealers to sell the Super-Six

Fifty-one makers of automobiles are announcing price increases from $100 to $400. But Hudson prices remain the same.

Even when these cars sold at lower prices, Hudson sales were greater than any two of them. Now that they sell for as much as a Super-Six, think what a demand there is for Hudsons.

It is certain that Hudsons will not advance for a time at least. Hudson prices are based on materials bought last fall. Cars which have advanced in price are made of materials bought on today's high markets.

Even before these price increases of other makes were announced, the demand for Hudsons was the greatest in the history of the company. Now no man will want to purchase a car at the advance price when he can get a Hudson with its reputation for quality and performance at $1650.

But Hudson franchises are hard to get. From time to time there is territory open to dealers who are real automobile merchants, men who have merchandising ability. If you think that you can qualify—if you think that you measure up to the Hudson dealer standard, write us.

HUDSON SUPER SIX

Hudson Motor Car Company
Detroit, Michigan

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In This Issue—Motoring with a Camera

You Can Take Hills on High Without A Knock

If you will keep your motor free from carbon. That knocking in your engine—the difficulty you have climbing hills—poor pick-up—lack of power—noisy motor—pre-ignition—in fact, 80% engine trouble is caused by carbon. Clean it out with

JOHNSON'S CARBON REMOVER

and your engine will run like it did the first 500 miles—quietly and full of "pep", and your gasoline consumption will drop from 12 to 25%.

You Can Do It Yourself

For 25c—five minutes time—and with no labor you, yourself, can remove all carbon deposits. Simply pour an ounce of Johnson's Guaranteed Carbon Remover into each cylinder—allow it to remain from 2 to 12 hours and then drive your car 10 or 15 miles. You will be surprised at the wonderful improvement.

Use It Every 1,000 Miles

If you will use Johnson's Carbon Remover at regular intervals, giving carbon no chance to accumulate, you will automatically eliminate most valve trouble and your engine will always be at its highest efficiency.
Write for our folder on Keeping Your Car Young—it's free.

If Your Dealer Cannot Supply You With Johnson's Carbon Remover—Use Attached Coupon.

S. C. JOHNSON & SON, MA, Racine, Wis.

S. C. JOHNSON & SON, Dept. MA, Racine, Wis.

I enclose $1.00 for which please send me by prepaid express enough Johnson's Guaranteed Carbon Remover to keep my motor clean for 6,000 miles.

Name .....

Address .....

City and State .....

My Dealer is .....

(A)

Made and Guaranteed by S.C. JOHNSON & SON Racine, Wisconsin, U.S.A.

MOTOR AGE

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NEXT WEEK

The feature of MOTOR AGE for next week will be an article on the Capitol Tour, which perhaps as much as any other one tour touches historical points of interest.

The technicalities of tire construction do not interest you. It isn't what goes into a tire but what comes out of it that counts.

Kelly-Springfield Tires

go their guaranteed distance on the road—not over the adjustment counter, and 7,000, 8,000 or 10,000 miles on the highway is a common Kelly-Springfield performance.

Kelly-Springfield Tire Co.
Executive Offices
Broadway at 57th Street
New York
General Sales Department
1900 Euclid Avenue
Cleveland, O.

The Task Now Confronting American Business

TO meet the gigantic demands of a world war upon our industrial resources, with the flower of our man power diverted to military service. To produce and transport more million tons with fewer million men. As President Wilson has pointed out: "It must be evident to every thinking man that our industries, on the farms, in the shipyards, in the mines, in the factories, must be made more prolific and more efficient than ever."

These industries stimulate all other lines of business. There is more activity—more money is spent—than would be possible in ordinary times.

But how can reduced man power be made more productive? By the use of more machinery and better machinery and by a more concentrated use of the equipment in hand. What is true of production is equally true of transportation. It is idle to produce if you cannot transport.

HIGH GRADE TRUCKS MUST REPLACE HORSES

Doing the work of three or four teams and their drivers, one truck would save 75% of the man power. One good truck which does the work of two poor ones will increase this saving. Each unit will be taxed to the limit to save time and men. The truck which is not designed to stand up under high pressure operation, day in and day out, season after season, will fail in the most vital respect—*constant performance.* Time out of service will be extremely expensive.

Even under ordinary conditions, the grinding, straining and pounding of truck service renders the best mechanism the most economical at whatever price. Under the extraordinary conditions before us *none other will take care of the traffic.*

WHITE TRUCKS

For years it has been the White policy to build only the best. There is no short cut to efficiency and endurance in a truck. Only the pick of material and the most refined construction will produce the White standard of service. The White truck has always been more economical than any cheaper make. In high pressure operation this superiority becomes something more important than economy; it means more days in active service—*a much greater volume of performance.*

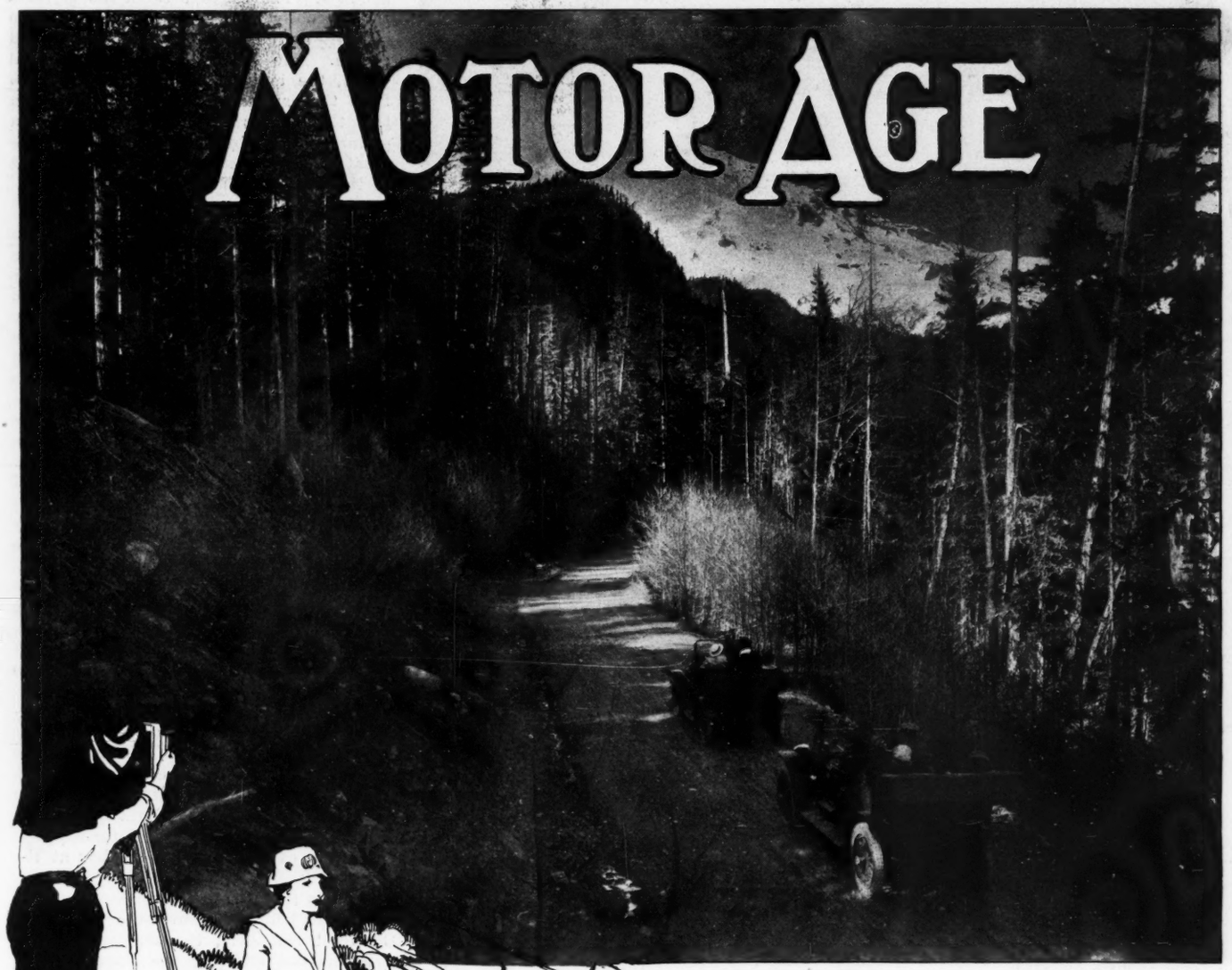
The largest users of motor trucks in this country recognize the White value. They buy it in fleets and add to these fleets year after year, based upon experience. They know the real value of a motor truck. Their cost records tell the story.

THE WHITE COMPANY, *Cleveland, Ohio*

When Writing to Advertisers, Please Mention Motor Age

Vol. XXXII, No. 9 CHICAGO, AUGUST 30, 1917 $3.00 Per Year

MOTOR AGE



Motoring with a Camera

by Ruth Sanders

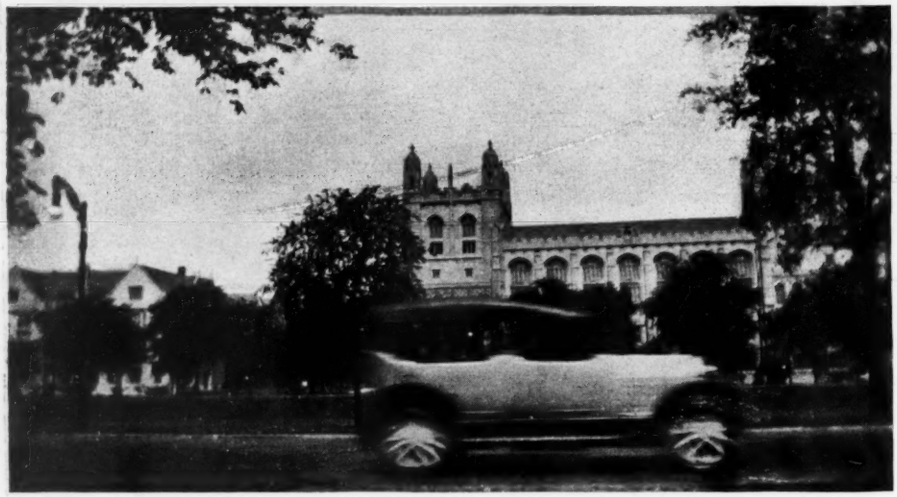
PRESERVATION and conservation are the orders of the day. You can the vegetables at home and save gasoline abroad. Tins and glass do the preserving in one case, and your carbureter attachment does the conserving in the other. Yet, as if these two were mere bagatelles, there is another, unheralded conservation and preservation that has been going on for years in a more magnified degree even, both at home and abroad, on the long tour and the short tour. It gets no nursing from the government or publicity from the press. It needs both. For the tenderfoot and the veteran abuse it, and it has given to the press the power to perpetuate for posterity a history no verbosity can give.

As the one greatest little score keeper for the motor car, the camera has no equal. You press the button and let Percy do the rest. Provided Percy and not you do the developing and printing. And when you press the button you stamp into the records of the world indelibily, for all to-day and to-morrow, a fair, unprejudiced picture of what the first car looked like, what the first transcontinental tourist encountered, the road to 3-mile creek of your last week-end trip and other great possessions.

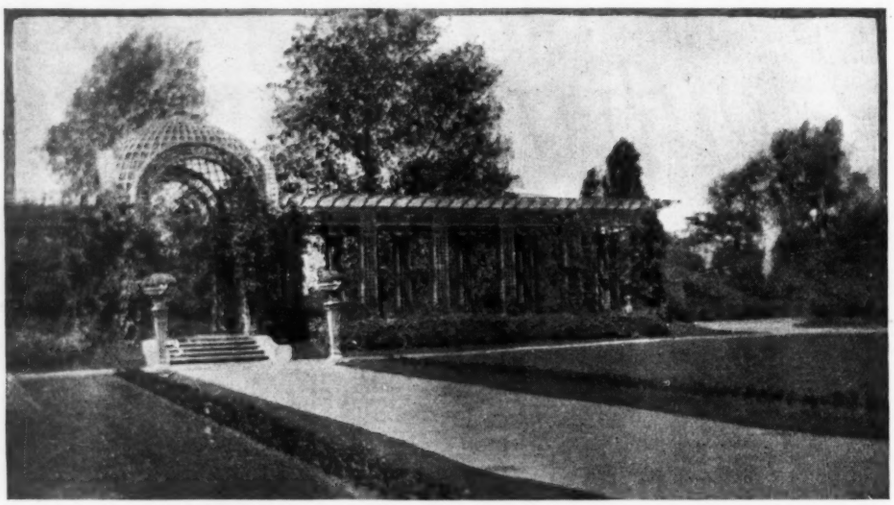
No one too amateur, no one too professional to carry a camera on a motoring trip. No trip too long, no trip too short to yield some fruit of the pleasures of touring. It is not the mileage you cover that makes motoring worth while. It is not the speed you make that brings you to the goal of motoring. But it is that intangible inspiration that comes as reaction to the open air, the long road and the wide country. Just so long as these impressions last, just so long do the inspirations avail. The camera catches and preserves the best in that you see as you motor along the road or pause for a noonday rest in sight of cool rocks, running brooks and green.

For these reasons to every motorist sooner or later comes the camera. The camera accompanies the stripped chassis on its test trip, rides by the side of the speeding racer, records the fortunes of the trip across country, marks the milestones and high spots of most touring and tantalizes the utter amateur in photography to dance to its whims.

A small box camera was used for the three photographs on this page. They show diversity and emphasize the beginner's chance to get better results if a figure is added. In the second the car gives a human touch, but the action ruins the picture



Usually where the beginner attempts to photograph moving objects the result will be disappointing. This is due solely to lack of appreciation of the circumstances and the conditions. A 2:10 clip cannot be snapped broadside at a distance of 10 ft.



It is astonishing how much detail a chance snapshot may show even with the use of the small camera. This photograph is little more than the size of the film, and the detail is only as apparent as in the original print made from the film

The professional needs no guide post in motoring with a camera. He, more likely than not, has been a camera motorist longer than he has been a professional. At any rate he uses the car and motoring as the center of a large division of his camera subjects. The car figures in his pictures for the daily newspapers, the weekly, the monthly as the focus of everyday or world events. The battlefield, the commercial world, the individual, all are inseparable from the car, and it is from the camera that the last word comes, whether it is a picture caught by the journalist of this great race or a picture taken by a motorist of the wayside camp he makes touring.

Begin at Beginning

It may be that you have poor success in motoring with a camera. If you do, it is taken for granted that you, like many others in the same box, are a beginner in photography, if not in motoring. The same remedy applies to both, in a way. Begin at the beginning. Learn the simplest, most essential things first, and only undertake fine screen work with a camera or carbureter adjustment with a car when you have mastered thoroughly the primer of camera or car.

Many beginners make the mistake of starting with too elaborate equipment. It is much like learning to play a piano by starting with Chopin or learning to drive a car by entering a speedway race with it. Start with a box camera. This has a universal focus, needs no extraordinary care in motoring and is most easily handled. You point at an object about 15 ft. away or miles away; there are no preliminaries —you aim and shoot.

Practically all amateur work to-day is made with the small film camera. Many of the fine photographs on exhibition were taken with a small film camera and then enlarged. The camera in its simplest form consists of a box, made light-tight, with a lens at one end and a means for supporting a film cartridge inside the box at the other end. Bellows, shutter and other attachments are merely convenient modifications; the bellows permits the folding of the light chambers, the shutter provides a means for allowing the light to pass through the lens for definite periods.

Perhaps before long you will be ready for the more complex camera. But it is simpler to use the box camera to learn through experience something about the essentials of picture-making than to struggle with the essentials of picture-making at the same time you are treading the mechanical mazes of a complex machine. Through your results with the box, or hand, camera you will learn some little something at least about lights and shadows, composition and the rest, that will be necessary if you are to make motoring with a camera the success you wish to make it.

Hundreds Every Year

Hundreds of pictures successful both from an artistic and from a commercial standpoint are made every day with the small camera. MOTOR AGE receives during a year hundreds of photographs made with a small, box camera, yet clear, clean-cut and in every way worthy of reproduction.

In beginning even with the small camera, if you will remember a few suggestions, you will be more apt to get pictures of artistic and mechanical value. These suggestions are:

1—Include only a few objects.

2—Have one object more prominent than the others. This will be the motif, or point of interest.

3—Do not have a point of interest located in the center of the picture, but have it located a little to one side and above or below the center.

4—Have lines leading toward the point of interest.

To follow these suggestions is simple once you get them well in mind. The ground glass in the box camera furnishes the means to follow them. Many beginners do not pay enough attention to the image in the glass. That is the reason for many of the poor films the developer handles daily.

Add a Tripod

As soon as you can add a tripod to your motoring camera equipment by all means do this. This will aid further in following the suggestions as to what should be included in a picture. With a tripod for the camera to rest on, you can study the image in the ground glass longer, shifting the position of the camera or tripod until the desired image is reflected in the ground glass, or finder, and you are sure you will get the result you want in the finished picture.

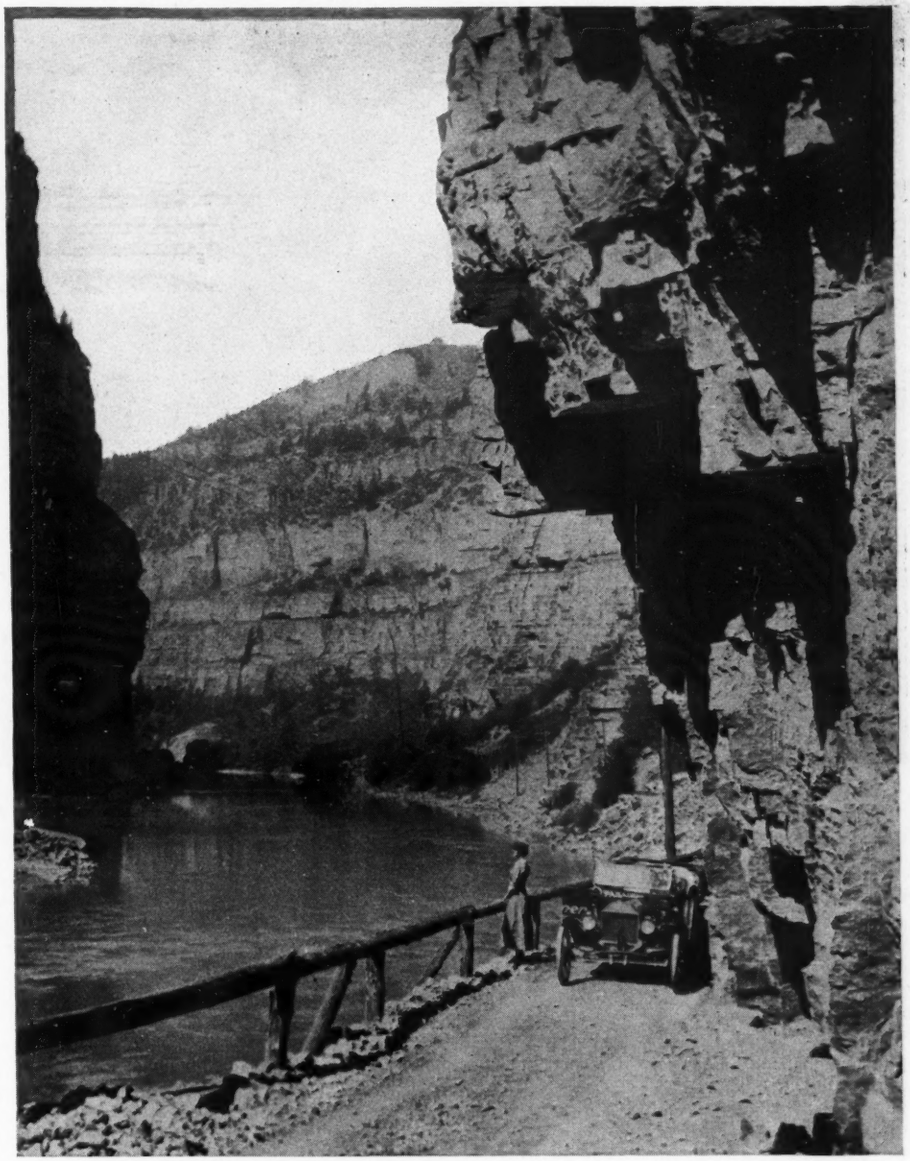
A tripod is almost imperative for time-exposure work. It is impossible to hold a camera steady in the hands for an exposure of more than 11 sec., it is estimated, and as for most of us, care must be taken so that the camera will not be moved during a snapshot. Once the camera moves while the film is being exposed, the image on the film will be blurred and the developed negative is more than apt to show blankness or a few waves, even if the scene before the camera contained no water but the sands of the desert. Always hold the camera steady and level.

Films have been advised throughout, because this article deals with motoring and films are more successful from the beginners' point of view than plates. In all motoring, whether of beginner or of adadvanced amateur and professional, it is easier to take care of the camera if it is one that uses films.

The box camera is not injured easily by jolts or jars of the car, but the camera with a focus can be damaged very quickly and seriously in traveling by car. Motorists have been known to take several rolls of films, only to find that some part of the apparatus was injured early in the game and the exposures that followed were to no purpose. The camera can be carried between the occupants of the tonneau, especially if it is the ordinary folding camera or small box outfit. If the camera is too large to be carried on the seat, roll it in a thick rug and lay it in the bottom of the car out of the way of the passengers' feet. Or, if the camera rides in a case, swing it between the folds of the robe that hang over the tonneau rail. Never carry the camera in one of the compartments of the car unless you are willing to risk its injury.

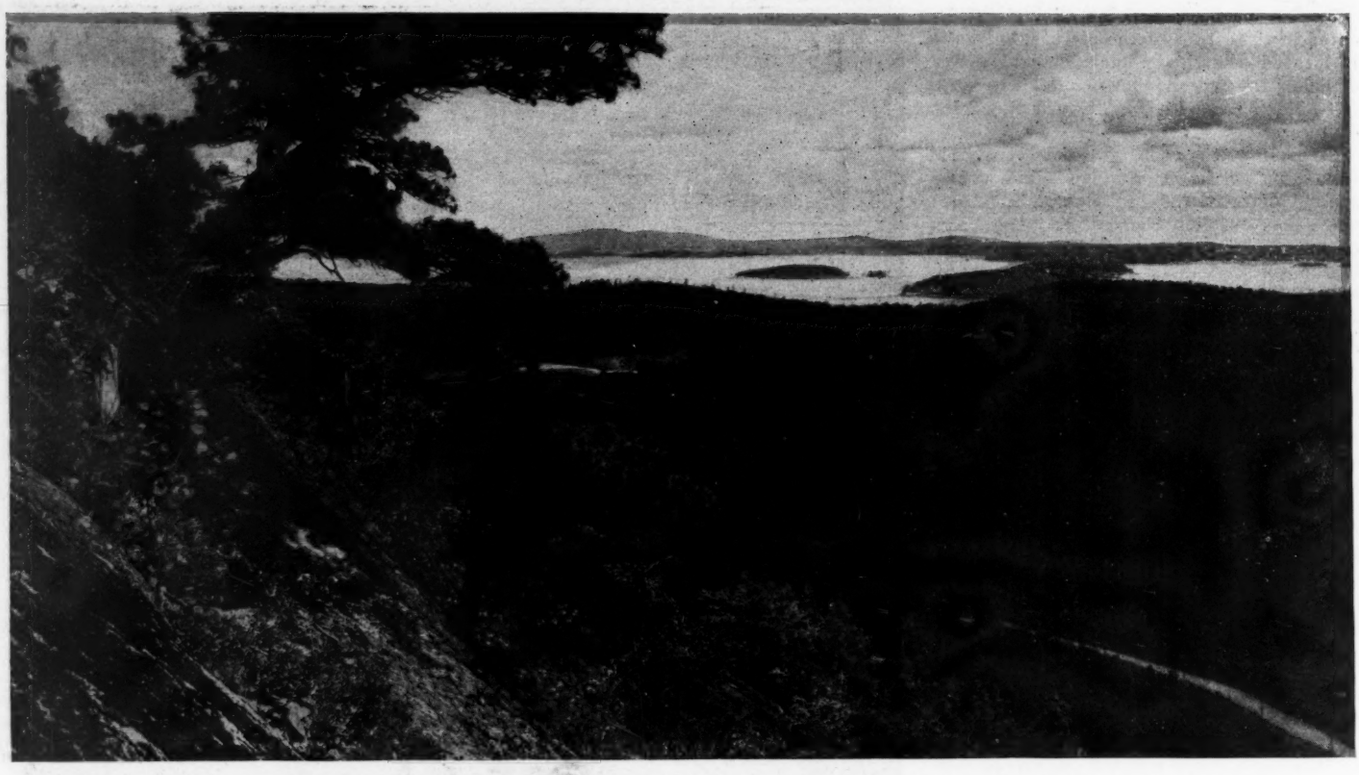
Why the Film

In every case of motoring with a camera it is advisable to have compactness in baggage and accessories carried. Therefore, the motorist who takes pictures prefers films. A dozen plates in holders take up a good deal of room in a car, whereas a roll of a dozen film exposures takes little room and is ready for instant use. Also,



A fine instance of what can be done with the small camera—human interest is here, scenic interest is here, and yet this is merely an enlargement of a small photograph which was taken on a motoring trip by an amateur photographer

The strain of figuring out how to get going may wipe out the picturesqueness, but nearly always someone with a camera will register the downs as well as the ups



You can hardly expect to take a picture such as this with a camera and equipment other than professional. It is again the case of trying to include too much in one picture. This photograph, taken in Maine, is not the product of the small camera. It was made by a professional and shows the marks of professional work, that is, work with elaborate equipment. With a small camera vacancy instead of suggestions of trees would have been painted in the background most likely

the heat generated in a car, particularly on the floor, where the average motorist will store them, is injurious to plates, fogging the delicate gelatine surface of the plate, while films are less sensitive to this heat.

It is for testing these occasional injuries to the motoring camera that the wise beginner has his films developed as soon as possible after exposure. If you are on a long trip, a photographer in one of the wayside towns will develop them and send them on to the next stopping place. It is even possible to mail them home if home is not too far away. This is taking it for granted, of course, that the beginner does not develop his own films. He seldom does. Neither does the advanced amateur chose to take his developing outfit along on a motoring trip. The procedure is the same in either case. There are cases in which amateurs will take roll after roll of film on a tour and not get a single good picture, all because the internal mechanism of the camera was injured by some accident of travel and he had no way of knowing it until the films were developed at the end of the tour.

Film Camera's Advantage

The film camera has the advantage of loading and unloading in daylight, as well as extreme lightness and compactness. Every process from loading to finishing the print can be accomplished in ordinary light with the film camera, though, of course, no one is advised to seek the brightest light to do these things. The film cartridge weighs but a twentieth as much as its equivalent in plates with the necessary holders, is non-breakable and can be developed without the aid of a darkroom.

To load the camera with film cartridge is very simple. The operation should be performed in a subdued light for safety. The film comes in light-tight rolls and extending the full length of the strip of film and several inches beyond is a strip of duplex paper, red on one side and black on the other usually, which with the flanges on the spool forms a light-proof cartridge.

Insert the spool and thread the paper into the spool at the other end. The camera is closed and the key turned until the paper has been reeled off and the sensitive film takes its place in the focal plane. The duplex paper runs with and behind the film and at intervals is marked 1, 2, 3, etc., to designate the exposure. These numbers appear in the small window at the back. The amateur should bear in mind constantly that the paper must be kept tightly rolled about the film all the time until it is in place in the camera and the camera closed, for should the film be exposed to light for even a hundredth part of a second it will be ruined.

This goes back to 1900 and the New York show; the camera preserved it

Snapshots are the simplest to make and ordinarily the simplest to develop, as they are most likely to be correctly timed, and the amateur usually begins his work with them. As simple as they are however, those who have taken many photographs repeatedly forget such simple things as to have the proper stop in and an unexposed section of film turned into position. To take instantaneous pictures the object should be in the open sunlight, but the camera should not be. The sun should be behind the back or over the shoulder of the operator. Effective pictures are taken in the face of the sun by shading the lens to keep the direct sunlight off, but this is not for the beginner.

What Kind to Buy

In the selection of a camera one rule is to buy the best you can afford. That is if you are willing to make the mistakes that come in the course of learning the mechanism of a complex camera. After the motorist has learned the essentials of picture-making with his little box camera he probably will feel his talents wasted unless he gets a more elaborate equipment. He will want a camera with a focusing attachment, timing device and extras. Excellent focusing cameras are produced at little more cost than the small box cameras nowadays. They give good results even in the hands of amateur. The prices range from $6 on up to $75, and they are made by the Eastman, Ansco and other companies with the idea of effective photography with the greatest ease of adjustment and so on.

The camera saved this glimpse of the first cross-country Franklin

FOR THE BEGINNER'S NOTEBOOK

Avoid elaborate equipment.

Keep a record of pictures taken.

Carry films rather than plates in a car.

Include a figure in each photograph usually.

Have your films developed immediately after exposure, say the next day.

Do not take pictures before 6 o'clock in the morning or after 5 o'clock in the afternoon.

Start with a box camera. It has a universal focus and is practically harm-proof, no matter how carried in the car.

Watch your time exposure attachment. Don't forget to push it in before you go back to snapshots.

Realize your limitations and work gradually toward photographs of distant mountain ranges, snow-capped peaks and glittering glaciers; in short, do not try to include too much in a picture.

The postcard size of exposure, 3¼ by 5½, is a very popular size just now. The cameras of this size fold into a small space and are ideal for the motorist because they are so compact. After the motorist outgrows this kind, if he ever does, the camera makers have yet other, more advanced, cameras in readiness. The Graflex is the latest word in advanced photography for motorists. It has a lens capable of doing the finest kind of work and has all the stops and controls that are necessary in obtaining individuality in pictures.

The Sooner the Better

The sooner every motorist adds a camera to his motor car accessories the better he will be able to get the full measure of all that is coming to him out of motoring. How much better are the files of a newspaper or magazine for the photographs sprinkled through? The motorist should have his own files, the photographs his newspaper or magazine, together with notations as to when, where and why the pictures were taken. Some of the picture albums in the hands of amateurs are sheer treasure troves of motoring. The trip through the canyons of the West, the tour in the Finger Lake region, the visit to the green grass regions, all have added their offerings in making up the motorist's record.

Which would you rather have—a picture of the first car to cross America or a description of that trip? Hard to choose, you say. For some, yes, but even he who chooses the description will find that something lacking which possession of an old photograph will give.

The opportunities for the motorist with the camera are practically boundless, once he has mastered his tool. The model of this year before so many years will be best known by its reproduction in picture. The lonely Taos of the Southwest, silhouetted against the blue of a land where all is color, in a few years will be best known by its reproduction in picture. The models of the past and the Taos of the past are best known now by sun records. And you need not lean on staff of professional to have these records. That is the beauty of motoring with a camera. Even the small box camera captures and holds captive through the decades the epoch of car models, the beauty of Taos Indian.

Motoring without a camera in 1904's tour would have lost this to us and to our records

To mention all the possibilities for photography when motoring with a camera would be impossible. The car itself will add to a photograph. In fact, for a beginner it is well to include the car in a picture. Make it the main object in a picture of scenery. A touch of something human or related to human life adds just that touch of personality which a beginner's work so often lacks. After all it is the car that makes it possible for so many amateurs to take pictures in widely separated parts of the country. With it he seeks the colorful deserts of the West, the inn-dotted cornfields of New Jersey and the seashell roads of the South. It gives him as subjects for his snapshots the alligator of Florida and the bear of the Yellowstone. It stalks for him the strange animals he has not known in a foreign section and at home calls to him the animals of more domestic abode. Surely, with all its effort and striving it should have a place in the camera's focus.

This is a Citizen's War as well as a Soldier's War

McNamara Adds Records

Maxwell Road Engineer Sets Three of Most Important Marks in Canada

Montreal-Quebec Time Beats Fast Express 59 Min.

DETROIT, Aug. 25—Ray McNamara, road engineer for the Maxwell, has broken some more records to smithereens. Perhaps the motoring public has become accustomed to this. A brief resume of his past achievements might indicate as much, for these last records, made in Canada this time, is only one of many.

In the short time of two weeks McNamara has established three of the most important road records for the Dominion of Canada. They are: Windsor to Toronto, 6 hr. 50 min.; Toronto to Montreal, 11 hr.; Montreal to Quebec, 4 hr. 1 min.

The Montreal-Quebec mark shatters all previous motor car records in Canada, beating the fastest express train time by 59 min. The Windsor-Toronto run covered 275 miles, and on the run McNamara carried three passengers. Between Toronto and Montreal the car went 360 miles, and the distance from Montreal to Quebec is 180 miles, made at an average speed of 45 m.p.h.

These runs are best appreciated by a glance at three, say, of the former records established by McNamara in a Maxwell, namely:

Detroit to Indianapolis and return in 1915, 20 hr. 1 min. for the 597.2 miles. The trip to Indianapolis, 298.6 miles, was made in 8 hr. 58 min., which was 1½ hr. faster than the fastest railroad train time then.

Philadelphia to Pittsburgh early in 1916, across the Alleghenies, made in 8 hr. 19 min., breaking all records for the famous 294-mile testing course.

Seattle to Portland, 1916, 199 miles, at 30 m.p.h. 13 min. less than the fastest limited record.

MAXWELL-CHALMERS LEASE

Detroit, Aug. 27—Details of the proposed Maxwell-Chalmers deal whereby the Maxwell company will utilize a portion of the Chalmers plant rapidly are assuming definite proportions. A stockholders' meeting has been called for Sept. 10 at which time all of the details will be definitely decided upon.

Although not a merger the Maxwell-Chalmers agreement appears to be likely to have much the same effect on the two companies. Since the proportion of the Chalmers' factory, which it is expected to use for Maxwell purposes is small, it will be possible to continue a reasonably large output of Chalmers cars. It is probable that Maxwell and Chalmers will be linked together in future sales by being confined to dealers who will take the two lines together. The management will be entirely in the hands of the Maxwell company and Hugh Chalmers will be chairman of the board. The status of other Chalmers directors is not yet determined. While it is understood that the Maxwell company requires the additional factory space to take care of anticipated Government orders for trucks or other articles, it is also planned to continue the manufacture of Chalmers cars.

The plan of the consolidation of the Maxwell and Chandler is said to provide that Maxwell shall lease Chandler for a period of five years on a basis of 50 per cent of the net profits from operations and guarantee to deliver the plant to Chandler at the expiration of the lease in good order, with its name and good will preserved and the inventory properly balanced.

TO TRAIN 2400 FLIERS

Dayton, Ohio, Aug. 27—The largest airplane field in the United States with a capacity for training 2400 men is being constructed at this city by 2500 workmen, 850 teams of horses and scores of tractors. More than 100 buildings have been erected and hundreds more will be constructed. Each building is placed in use as soon as finished and more than 300 student aviators are now encamped on Wright field. Three kinds of machines are provided: the Curtiss, the Wright biplane and the standard model used by the allies. There are small machines built for speed of 150 m.p.h. or more—machines built for rapid ascension, and heavy airplanes designed to carry six men, machine guns and bombs.

FIFTEEN AT UNIONTOWN RACE

Uniontown, Pa., Aug. 28—Special telegram—Fifteen entires for the Army and Navy sweepstakes transferred here from the Cincinnati speedway have already been received and lines are out for at least four more which are expected to arrive before the lists close Thursday at midnight. The Labor Day races will consist of the sweepstakes and the 100-lap dealers' race. The entries to date are:

Car	Driver
Duesenberg	Hearne
Duesenberg	Milton
Duesenberg	Henderson
Unnamed	McBride
Golden Submarine	Oldfield
Delage	Elliott
Erb Special	Burt
Omar Special	Toft
Johnson Special	Monahan
Crawford	Ewan
Pugh Special	Meters
P. A. L. C.	Haibe
Hudson	Conway
Miller Special	Cadwell
Mercer	Boettcher

LIGHTER HUPP SOON

Detroit, Aug. 27—The Hupp Motor Car Co. in the six months ended June 30 earned net profits of $337,009, which, after allowing for preferred dividend requirements, is equal to 5.6 per cent on the $5,192,100 common stock outstanding, par $10. In the six months ended Dec. 31, last, the company showed a $65,530 loss, so that for the year ended June 30 the company earned a net profit of $271,000, which, after allowing for preferred dividends, is equal to 3.4 per cent on the common stock.

J. Walter Drake, president of the company, stated to the stockholders that development of a lighter car to sell at a lower price is being made at the factory now. The new car will be ready for distribution during the latter part of the year.

Gil Anderson May Drive

Former Stutz Pilot Promises to Race at Chicago Labor Day

Cars Must Qualify at 100 M.P.H.—Popular Prices

CHICAGO, Aug. 27—Labor Day may see Gil Anderson back in harness again after a year of racing inactivity, most of which was spent in recovering from a broken leg sustained at the initial Cincinnati race on Labor Day last year. There is in Chicago at present a newcomer in racing affairs in the person of L. L. Lane, whaler, trader and wealthy resident of San Francisco. A machine has arrived from the Pacific Coast which has a Delage engine and aluminum body, and unless something happens at the last moment, Gil Anderson will take the mount at next Monday's race with Lane as the backer. One race of three heats will be run, the first one beginning at 2 o'clock with a half-hour interval between heats. There will be one heat of 20 miles, one of 50, and one of 100, each one carrying points, and the points are so arranged that it would take a mathematician to determine how any driver could be declared winner without participating in all three. They are:

Place	20 Miles	50 Miles	100 Miles
First	35	90	175
Second	20	50	100
Third	15	40	75
Fourth	10	25	50
Fifth	8	20	40
Sixth	7	15	35
Seventh	5	10	25
Total	100	250	500

De Palma Enters

A wire from Ralph de Palma this morning brought word that he would be at the starting line. Entries received so far include:

Car	Driver
Packard	De Palma
Frontenac	Chevrolet
Hoskins	Lewis
Hudson	Vail
Ogren	Ogren
Pan-American	Alley
Olson	McBride
Lane	Anderson

Barney Oldfield was expected, but Uniontown claims his entry for Labor Day. For the first time each car will be required to do 100 m.p.h. for a 2-mile lap in eliminations to participate. The elimination trials will be held Saturday and Sunday and practice will begin Wednesday. Popular prices will be charged, these being set at $1, $2 and $3, with no charge for parking space.

Percy Ford, who won the dealers' race June 16, and Paul Harvey, who won the Ford race on the local speedway last fall, are casting about for cars to drive and may be in the lineup when the signal is given to start next Monday afternoon. Prizes will be a percentage of the gate.

BAY STATE'S FIRST RACE

Boston, Mass., Aug. 25—The first motor race ever held on the sands of Massachusetts took place last Saturday when a dozen

This is a Citizen's War as well as a Soldier's War

cars competed in a mile race at Nantasket Beach at the carnival of the Kenberma Associates. This was the second time New England has had beach races, the other being at Old Orchard some years ago. The race last week was so successful that the officials of the carnival propose to make it an annual event and have a series of races that will take up the whole day. The contest was run in heats, with four cars to a heat. First place was captured by a Peerless Eight roadster owned by George E. Dodge, proprietor of a big amusement resort, and driven by E. H. Murdock. The winner's time for the mile was 45 sec. Second place was captured by a Murray Eight owned by Walter Baker.

TWO RACERS END RACING

Los Angeles, Cal., Aug. 24—Two racers here have ended their racing days. Billy Taylor left recently to join the Canadian Royal Flying squad, and Eddie Pullen has taken the Saxon agency at Oakland, Cal. Taylor spent a month at the Monterey citizens' training camp last summer, is a licensed aviator and an expert mechanic but was rejected when he sought to enlist in the Army aviation school at San Diego on account of a leaky heart valve. For that reason he went to Canada, where the entrance is less difficult, to enlist.

MINNEAPOLIS FORMING RESERVE

Minneapolis, Minn., Aug. 27—The dealers of Minneapolis have set Aug. 29 as the date on which they will organize the owners of the various cars they represent as a corps in the Minnesota Motor Reserve, which has as its purpose the furnishing of a quick means of transportation for the county sheriff forces in case of emergency and such other duties as may be necessary in maintaining order and protecting the interests of the citizens during the absence of the National Guard from the state on war duty.

The dealers have set 5000 as the number of members for this corps, and the first step is to organize the owners by squads, according to the make of car and in groups of twenty-seven. Service is for the county only unless otherwise specified at the time of enrollment. A civil sergeant and two civil corporals are to command each squad. The plan is in accordance with that being followed all over Minnesota, as well as in other states.

SHOW ROUTES VISITORS

Chicago, Aug. 27—With a record of 250 of the 300 exhibit spaces at the Coliseum contracted for thirty days before the opening of National Exposition for Ford Accessories, its backers are confident that the initial exhibition will be successful. A feature of the preliminary advertising show is that of the touring bureau established under the direction of A. R. Woodall of the Automobile Blue Book. A corps of road scouts has been delegated to cover the highways within 500 miles of Chicago and obtain detailed road information for the guidance of motorists planning to tour to Chicago for the exposition, which will be held Sept. 22-29. The main routes are reported in excellent condition.

Gas Control in Air

Officials Expect Licensing System for Industry Instead of Price-Fixing

Increased Oil Production Gives Bright Side

CHICAGO, Aug. 27—The gasoline situation seems to have aroused motorists throughout the country, the most of them becoming needlessly apprehensive as to the immediate danger of commandeering of the gasoline supply by the government. Though army needs will influence to a great extent the amount of gasoline available for motoring in general, reports of the oil fields do not bear as pessimistic flavor as would be expected, and the prospects are that motoring will be even more than usual.

Officials admit that regulation of the production and distribution of crude oil and its products probably will come. Should this come the government, not being authorized to fix a scale of prices for oil, most probably will provide a licensing system under which the industry will be required to operate. The scarcity of oil, to which President Bedford of Standard Oil, recently called attention in a public statement, is thought to have specially focused the attention of government authorities on the oil situation.

Texas oil production increased materially in the three months ended June 30, according to reports officially made to the state comptroller. Altogether, 193 companies reported on production, an increase of thirteen over the quarter ending June 31. During the last quarter the production was 7,703,163 bbl., valued at $9,202,723, comparing with 6,353,041 bbl. for the preceding three months. The average value of each barrel was $1.24.

More Crude Petroleum

There has been a marked increase of crude petroleum production of the different Gulf coast fields, and plans for enlarging the refining facilities of Texas are being considered. Assurances are of five new refineries in the vicinity of Houston, Tex., within the next few months. These include the proposed plant of the Sinclair Oil & Refining Co., which will have an initial capacity of 20,000 bbl. a day. In addition, seven companies definitely have undertaken steps to erect refineries before many months shall have passed.

California reports much uneasiness among motorists and, on the other hand, favorable conditions in the Mexico fields. The price of engine distillate was boosted from 10 to 11 cents a gallon a week or so ago by Standard Oil and the so-called independent companies followed suit. For more than a year California has been attempting to develop the use of distillate for passenger cars, and it has been somewhat successful. Distillate is headed toward gasoline's level, however. Less than a year ago distillate sold for 9 cents a gallon. Oil company officials have been trying to get Los Angeles to lower the standard of gasoline for motoring so that the price of gasoline will not rise on account of it. Permission also is sought to market synthetic gasoline.

It is claimed by certain of those who have authority to know in California that American owners of oil wells in Mexico could bring from 500,000 to 1,000,000 bbl. of oil a day to the United States if given the required encouragement to build pipe lines and assurances of permanent safety. There is said to be a supply of something like 800,000 bbl. a day in Mexico, the removal of which is not attempted owing to shortage of pipe lines to the coast.

Meanwhile the suggestions offered by Van H. Manning, director of the bureau of mines, and given in MOTOR AGE recently, as to economy in gasoline, still hold good. It is not necessary to store up your car, and you will not have to store up your car unless unforeseen conditions arise. It will be necessary for you to help save gasoline by proper carburetor attachments and so on if you do your patriotic bit.

NATURAL GAS MAY AID

Washington, D. C., Aug. 25—The natural gas-gasoline industry promises to become a factor in the oil situation, according to the Geological Survey. John D. Northrop of the Survey states that 1916 was one of marked expansion in this industry. The quantity of raw gasoline extracted from natural gas and sold in 1916 was 104,212,809 gal., a gain of 38,848,144 gal., or 59 per cent, over 1915.

The quantity of commercial gasoline represented by this output of raw, casinghead product, was probably more than 200,000,000 gal., it is estimated.

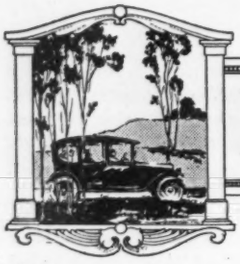
The average price in 1916 for the unblended product at the sources of production was 14 cents a gallon and the market value of the entire output was $14,408,201.

The volume of natural gas from which this quantity of gasoline was recovered is estimated at more than 208,800,000,000 cu. ft., the average recovery of gasoline per thousand cubic feet by all methods being about ½ gal. The number of plants for extracting gasoline from natural gas increased from 414 at the beginning of 1916 to 594 at the end of the year.

Of gasoline thus extracted the output by states was greatest in Oklahoma, by gallons, with other states producing in order, as follows: West Virginia, California, Pennsylvania, Ohio, Illinois, Louisiana, Texas, Kentucky, Kansas, New York, Colorado.

TO REORGANIZE EMERSON MOTORS

New York, Aug. 24—A plan to wipe out all the old stock and reorganize has been formed by the Emerson Motors Co. Under the plan it is proposed to call a meeting of the stockholders to authorize the sale of the assets of the old company to the new one. The total liabilities are $2,803,192, after adding in $42,154 unsecured indebtedness, the valuation of physical assets approximating $840,197. The company has $2,718,883 in capital outstanding, including $2,377,388 common and $341,095 preferred.



EDITORIAL PERSPECTIVES

Conserve Your Gasoline

UPON the U. S. A. devolves very largely the problem of shipping huge quantities of gasoline to Europe. Couple this with the great increase in the number of cars, the number of trucks and the vast increase in airplanes and you gain some conception of what increased consumption of gasoline there will be during the coming year.

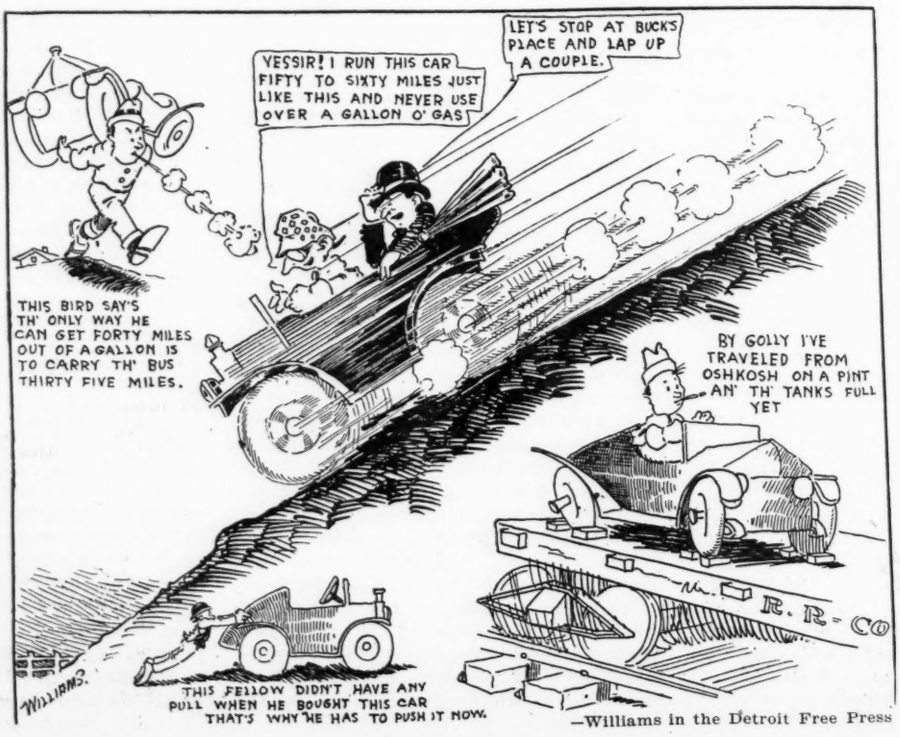
THE placing of a million men in cantonments in this country alone means a big gasoline expenditure in that these men are taken out of the normal channels of life and added service is necessary to take care of them. Back in the towns and cities where these men came from it will be difficult to cut down the amount of gasoline used in working for them. For example: The grocer who has been delivering to the homes of these men will still have to keep on delivering and his consumption of gasoline will not be reduced to any appreciable extent. This applies in a thousand channels of motor transportation required for caring for the organized work of life.

THOSE who are at home to-day, those who are not enlisted, those who are enjoying themselves with a motor car should at least do their bit to help the situation in France. They can do it by conserving the gasoline supply. Conserving the gasoline supply does not mean restricting the use of the car but rather the more efficient use of the car. We have no definite figures, but from a hundred cases we know of it is almost certain that there is scarcely a car in the country that cannot be made more efficient in the use of gasoline. There is scarcely a carbureter that cannot be cut down in one way or another. Reduce the mixture a little. It may make it a little harder to drive; you may lose some of the acceleration you are so proud of; you may have to shift a little more on hills; and it may be a little harder to start, BUT IT IS UP TO YOU TO DO YOUR BIT AND YOU SHOULD BE VERY WILLING TO START RIGHT NOW AND MAKE ANY NECESSARY SACRIFICES. IF YOU HAVE NOT ENLISTED, THEN DO NOT GO OUT DRIVING AGAIN UNTIL YOU HAVE CHECKED UP THE CARBURETER ADJUSTMENT. DO YOUR BIT.

National Tractor Demonstrations

THE farm tractor industry cannot afford to have any more meaningless tractor demonstrations such as held at Fremont, Neb., this year, but the industry demands tests which will work as much good for it as the technical reliability tests worked for the motor car industry ten years ago. Those motor car reliability trials with a stiff technical inspection before the start of the run, with parts protected by seals during the run, with observers on all cars and with a severely stiff technical examination at the finish of the run worked wonders for the more rapid development of the motor car. True, those trials upset factory calculations in not a few cases. There were concerns whose cars were pretty well broken to pieces at the end of the first or second day. There were long-distance telephone calls to factories urging them to drop at once certain features of construction and adopt others. Design was put through the mill then. Progress that would normally come in five years was crowded into a season or two at the most. They were the refining days of the motor car. For several years this work was kept up and it worked an incalculable amount of good. It is too bad such trials were not continued, because not a few makers of cars in these last few years have been imposing on the public car constructions that would have been quickly given the black eye by such contests.

HOW MANY MILES HAS A GALLON?


YESSIR! I RUN THIS CAR FIFTY TO SIXTY MILES JUST LIKE THIS AND NEVER USE OVER A GALLON O' GAS
LET'S STOP AT BUCK'S PLACE AND LAP UP A COUPLE.
THIS BIRD SAY'S TH' ONLY WAY HE CAN GET FORTY MILES OUT OF A GALLON IS TO CARRY TH' BUS THIRTY FIVE MILES.
BY GOLLY I'VE TRAVELED FROM OSHKOSH ON A PINT AN' TH' TANKS FULL YET
R. R. CO
THIS FELLOW DIDN'T HAVE ANY PULL WHEN HE BOUGHT THIS CAR THAT'S WHY HE HAS TO PUSH IT NOW.
WILLIAMS

—Williams in the Detroit Free Press

BUT to get back to the subject: The farm tractor industry requires such tests to-day and will need them very badly for perhaps three or four years. The trials this year simply told you nothing. There were practically no rules governing them. After the five days of trials were over you did not know how much land any machine was capable of plowing in a 10-hr. or 12-hr. day. You did not know how many of the machines could work continuously

that length of time without attention. Or how much kerosene a single machine used per acre plowed. The men entering the machines in the majority of cases did not know this. Nobody actually knew how much more efficient it was to use gasoline than kerosene. Nobody knew how much cylinder oil was used, although it was apparently necessary for several makers burning kerosene to change all of the oil in the crankcase every morning. This meant only one thing, namely, that a very large percentage of the kerosene which should have been burning was passing the pistons and entering the crankcase, where it was ruining the motor lubricant and perhaps wearing out at a very fast rate crankshaft and connecting rod bearings. Nobody knew just how many hours the motors could work at their full plow load without taking on water. Burning kerosene calls for increased waterjacket capacity, particularly over the cylinder heads, around the spark plugs and around the valve seats. Taking on water during a forenoon or during an afternoon may cause not a little inconvenience with many farmers, and it should be known if a tractor motor has adequate waterjacket capacity for burning kerosene when working for hours under its rated draw-bar load.

THE tractor industry is brimful of misunderstanding with regard to the efficiency of burning kerosene. The farmer seems to be leading many tractor makers by the nose in this controversy, but too often these makers either do not know the facts or are afraid to get up on their toes and assert themselves, letting the real truth of the situation be known.

TRACTOR demonstrations are intended to work toward settling such problems as these. The rules governing the tests should be formed to solve such matters. Comprehensive and intelligent rules must be formulated to cover such points, and there must be an impartial and disinterested enforcement of the rules. Not only the conduct of the demonstrations but the formulating of the rules should not be in the hands of tractor makers competing in the demonstrations.

THERE must be an impartial and efficient observer on each tractor who gives the management a complete and detail report of all work done on the machine during the day, and all enforced stops.

THERE must be an accurate record kept of the plowing capacity per acre of each machine, as well as an accurate record of the amount of fuel and motor oil required.

THERE must be a complete record of every minute's work done on every tractor with a record of how much time was required and what work was done.

THERE must be a record kept of every time water had to be taken on, and penalties should be imposed for taking on water, fuel or oil oftener than at stated intervals, preferably every 10 hr.

THERE should be a drawbar dynamometer between the tractor and plow of every machine, so that if the machine should exert its rated drawbar for the entire day, this could be told from the average reading. Sometimes the pull will go above the rated and sometimes below it, but the daily average could be obtained.

THERE should be an elimination tractor-plowing test of perhaps 5 hr. duration, followed by 2 hr. test on the belt pulley. Each machine should be required to show a certain percentage on such tests. Toward the end of the demonstrations there should be a tractor endurance plowing test of 12 or 15 hr. work at rated capacity. This should be followed by a 5-hr. belt test at rated capacity, followed immediately by a 2-hr. belt test at maximum power.

THERE should be a stock registration of tractors made on standard forms and certified to by a committee that visits the tractor factories to check up the stock status of machines in manufacture. The machines at the demonstrations should check up with such established stock status.

THESE are only a few suggestions covering apparent points in which it is necessary to get down to facts at the earliest moment. Such a test will eliminate many hopelessly weak designs that are a bad advertisement to the tractor industry.

Coal Gas to Rescue of British

Scotland, Too, Learns the New Motor Fuel

THE use of coal gas in the British Isles is increasing each day. First-class petrol, or gasoline, is no longer obtainable for private motor cars in Scotland, and in England only under special permit. The gasoline situation there gets worse instead of better. Wholesale prices of gasoline were raised 4 cents a gallon recently, bringing the quotation up to 90 cents a gallon, which includes the taxes and license duties in addition to the retail price, which is paid in advance when the license to purchase is obtained. In Scotland substitutes for gasoline sell for 53 to 58 cents a gallon and are far from satisfactory. Fuel substitutes are difficult to obtain at all in England, and kerosene has to be entered on the license the same as gasoline.

In normal times the supply of benzol is estimated at 80,000,000 gal. a year, or little less than the total motoring fuel consumption. The government takes it now, so none is available for the public.

London has been experimenting with coal gas as fuel for some time. It is found that a gallon of gasoline can be replaced by 250 cu. ft. of coal gas. The cars using coal gas substitute gas bags for the steel cylinders, the steel naturally being needed for war purposes. In Scotland the gas is carried in a rubber-canvas bag on top of the car. There it costs 71 cents a 1000 cu. ft. and gives a saving of about 50 per cent in fuel. The price varies in London. In the north, near the coal fields, it is sometimes as low as 24 cents a 1000 cu. ft., increasing in other places to as much as 72 cents. Even at the latter figure, however, the actual cost of the gas used works out equivalent to 24 cents a gallon, or in the case of cheaper gas, to 8 cents a gallon.

Where the gas is used the connection with the engine is made through the induction pipe just above the throttle valve. Absolute combustion of the gas has not been attained, but it is believed it soon will be with experiment. The only difference detected in the running of the engine is that gas gives slightly less power. A big development in the use of the coal gas is expected as soon as normal times return, particularly in the omnibus field. One omnibus company now makes a double journey of 15 miles on one filling of the holders, which have a capacity of about 800 cu. ft.

Managers of corporation gas works are preparing for expansion of sales of the gas. The market may even become permanent in character if inventors can provide rigid cylinders of a size and lightness suitable for commercial motors. It is thought that if satisfactory cylinders can be fashioned the fuel may compete successfully even in normal times with petrol or gasoline.

England has not as yet become Americanized in its garage methods. One point of interest is that in regard to the tank installations. Tanks in front of the garages are practically never seen. There are not more than two in the country where cars can be filled up without going right inside the garage. As equipment in the garage, there are a number of Bowser tanks in use in the big public service companies such as omnibus and taxi-cab stores using them. There are usually certain local by-laws which prevent the use of outside tanks and supplies.

This is a Citizen's War as well as a Soldier's War

800 Air Engines Daily

England Concentrates on Aircraft Factories—Motor Car Production Halts

Eye-Witness of Aerial Bombardment Here

ENGLISH factories are turning out 800 airplane engines daily at the present time, while the motor car business is almost at a standstill, the factories formerly engaged in building cars now turning almost all their attention to the making of airplanes and munitions. This is the word brought direct from London by J. B. Clarkson, managing director of Hope Gibbons, Sons & J. B. Clarkson, Ltd., Wellington and Christchurch, N. Z., who is now on his way to the Antipodes after having spent some months in Great Britain and also the United States purchasing supplies for which his company is a distributor in New Zealand and Australia.

Mr. Clarkson was a witness to the recent bombardment of London by German airplanes. His son is in charge of an airdome in the vicinity of London which is one of many maintained by our British allies for the training of aviators, and happened to be in the airdrome at the time twenty-two German planes were sighted and stood beside an anti-aircraft gun while it fired ninety rounds, during which time English birdmen, together with operators of the anti-aircraft defense pieces, drove back the German planes.

The motor car situation, according to Mr. Clarkson, is almost at a standstill in England. Light cars that sold for $1,000 to $1,500 three years ago now have a market value of from $2,500 to $3,000, notwithstanding their age. Owners of heavy cars are the buyers of these used light cars. They find the lighter vehicle more economical in fuel consumption, which is the material factor when it is considered that gasoline commands a price of from 85 to 90 cents a gallon, and that only a limited amount weekly is allowed each car owner.

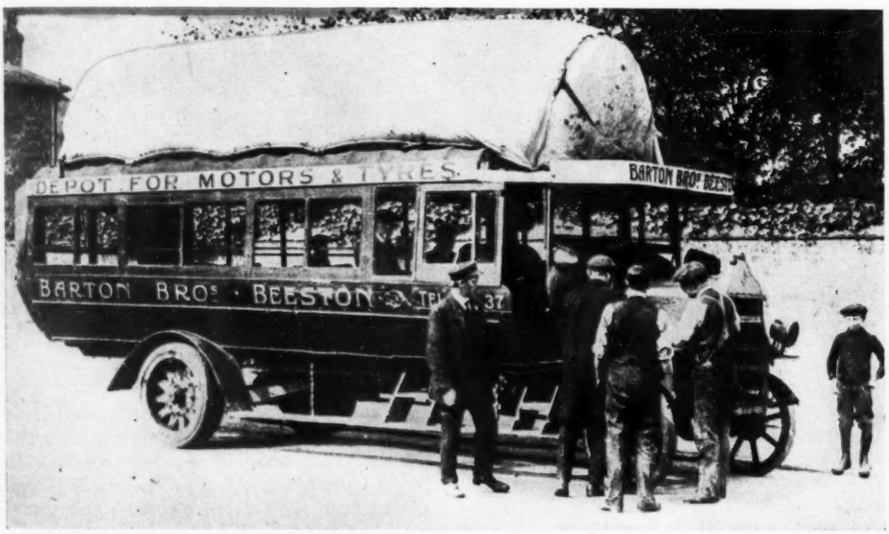
Some of those factories that were making light cars previous to the war continue to turn out two or three a day, but this production is a negligible quantity so far as supplying the demand is concerned. Great Britain gets most of its motor car fuel from America, but present prices make touring almost prohibitive and very few cars are used for anything except business.

England is turning out expert aviators at a rapid pace, and these men get practical flying instruction almost from the start. There is no long period of training, and the prospective pilot is given charge of a plane under the direction of an instructor without much, if any, preliminary work. The allies have drawn the lines closely in designating the physical type of men who can enter the aero service.

England is not concentrating on any one type of aviation engine such as the United States has in mind, but factories are turning out duplicates of those types which are found to be the most dependable in actual conflict.

English women are performing most of the tasks that once were done only by men. Seventy-five per cent of the farm work in Great Britain, Mr. Clarkson says, is now done by women, and women are to be seen as elevator operators, bus drivers, street car conductors and also in the place of the brass-buttoned bellhop in the hotels. In the munition factories and machine shops by far the greater percentage of workers are women.

In returning, Mr. Clarkson came to a Canadian port without sighting a submarine and declared he was impressed by the manner in which boats now leave English ports. These ships start across the Atlantic to the West, perhaps as many as twenty-five or thirty at one time, and all about them are battleships, submarine chasers and patrol boats, which stay on guard until they are out of the danger zone.



The high cost of gasoline has led to experiments with gas to run motors abroad. The supply is carried on top in a bag and so far the use has proved entirely satisfactory

Air Commission in Italy

U. S. Representatives Inspect Fiat Factory and View Air Maneuvers

Details of Structure and Design Are Given Freely

PARIS, Aug. 1—Howard Marmon, Herbert Hughes, and the various military members of the American Aviation Commission returned to Paris this week after a detailed visit to the Italian motor car and airplane factories, followed by a few days on one of the most interesting portions of the Italian front. At the Franco-Italian frontier station the commission was met by cars sent by the Fiat company and carried direct to the Fiat factory at Turin. This being the biggest factory in Europe, with 18,000 workers and an output of seventy-one trucks a day, in addition to airplanes, airplane engines and other war material, a considerable amount of time was spent here.

The Fiat directors threw their entire factory open to the visitors and placed the latest data and experimental work at the disposal of the technical members of the commission. Howard Marmon voiced the appreciation of the commission at the generous manner in which the Italian authorities and technical experts entered into cooperation with them and the eagerness which was shown to let the American delegates profit by all their knowledge and experience. Other factories in Turin, notably the Spa, were visited, followed by a trip to the airplane and motor car plants at Milan.

All Details Given

In addition to being given all details of structure and design, the commission had demonstrations of the practical work accomplished by airplanes, singly and in fleets. To demonstrate the conditions of aerial combats, trick flying was done with all kinds of machines. Several pilots with three or more passengers aboard and water-cooled engines looped the loop continuously for several minutes, thus showing that this class of work is not confined to light scout machines with air-cooled engines. While one of the pilots was flying on his back at 1500 meters, or about a mile, his machine caught fire. For 1000 meters the machine nose-dived to the ground in a blazing condition, and when it disappeared the commission had the conviction that the pilot neither could pull out of the nose dive nor escape from the burning mass. An hour later, however, the pilot joined the commission at dinner, absolutely unhurt.

At one town the commission was given a demonstration of how the aerial defenses operated. While on a height overlooking the city, warning of an enemy attack was given. Within 3 min. all the anti-aircraft batteries were manned, and in less than 10 min. several squadrons of fast Nieuport scout machines were seen in the air, opening out in battle formation to go in search

This is a Citizen's War as well as a Soldier's War

of the supposed enemy. Several members of the commission went to the front by airplane, passing across Italy in its greatest width. While at the front, and on Austrian territory, the commission watched the departure of bomb-dropping airships. On another evening they were informed that a fleet of airplanes would cross over the lines at 9.30 p. m. on a raiding expedition over enemy territory. At exactly 9.29 p. m. the bombing machines, flanked by fighting scouts, passed above the camp in which the commission was staying. While at the front all the members of the American commission had the honor of being presented to the king of Italy and of being invited by him to a dinner served on captured territory in full sight of the Austrian trenches.

Howard Marmon spoke enthusiastically of the fine motor service maintained by the Italian army in the field, as well as of the various fine motors for airplane service he was able to examine in the field and in the experimental department of the various factories. Of the 104 mechanics brought over by Mr. Marmon forty are in England and the remainder in various French factories. These men have been given every assistance possible by the factory heads—English and French—and have obtained such an insight into European airplane engine construction that the American industry cannot but profit. All the members of the commission declare there is no spirit of jealousy and no hesitation whatsoever in the giving out of valuable detailed technical information calculated to help the American factories in the big airplane campaign that country has undertaken.

200,000 FARMERS ATTEND SHOW

Des Moines, Iowa, Aug. 25—More than 200,000 farmers are in Des Moines this week attending the show at the Iowa state fair. Thousands of them have come in motor cars, and many more are buying cars at the fair grounds, where the show is an important feature of the fair.

While not directly under the auspices of the Des Moines Automobile Dealers' Association, the show is managed by Dean Schooler, the president, and C. G. Van Vliet, secretary. Practically all members are represented by exhibits. It is in effect the fall show of Des Moines dealers, though under the control of state fair officials.

Thirty makes of passenger cars, seventy-five models in all, are on exhibition beneath the grandstand at the race track. Machinery hall houses ten truck exhibits with thirty models and the twenty-one accessory booths.

Iowa farmers are here with their pockets full of money and ready to keep up the state's reputation as leader in the number of cars per capita. The Iowa agricultural conditions are abnormal this year. The oat crop is enormous. Corn, though late, promises to bring at least a dollar a bushel, while the oats will go at 60 cents a bushel. The potato crop is the largest ever.

The Des Moines association plans to follow the fair show with a display of closed cars in October. Each dealer will hold open house in his own salesrooms.

U. S. Calls for Fliers

Thousands of Young Men Are Needed to Insure Proposed Aircraft Program

Manufacture by Production Board Cuts Cost of Planes

CHICAGO, Aug. 27—The War Department is calling for thousands of young men to volunteer for the army of fliers which is expected to wrest control of the air from Germany. The men who answer the call and qualify for commissions will be relied upon to silence the German guns far back of the lines when the Allied armies commence their great drive next spring.

The call is interpreted thus: Brigadier-General Squier, chief of the Signal Corps, with the assistance of the aircraft production board, has completed plans for the construction of the great fleet of machines which the United States is to turn out within the next year.

While the perfection of the aviation engine for the aircraft fleet is progressing satisfactorily, the experts at work on the engine are compelled to proceed slowly with their experiments. The question of providing a battleplane capable of carrying fifteen or twenty men and a 3-in. rapid-fire gun, which has been given consideration for some time, still is interesting the experts through the possibilities for its successful utilization.

At the present time three camps in Washington and Oregon are engaged in cutting down a total of 300,000 ft. of spruce daily for airplanes.

Activities in the factories in regard to the airplane are those of the Garford Mfg. Co., Elyria, Ohio, which is working on a large tractor biplane, and the prospective outcome of Glenn Martin's conference with Cleveland, Ohio, capitalists as to a reported $2,500,000 concern.

The Garford biplane under construction will have a wing spread of 92 ft. and will be equipped with two Sunbeam engines of 350-hp. each. The engines are already en route to the plant, and a large force is at work on the wings, propellers, fusilage and so on. The machine is of the battleplane type and was designed by Captain Martin, of England, who is said to be on his way to supervise its construction. A special transmission is used, which permits driving both propellers from one engine if desired. In addition to a crew of three men, the plane can carry 4000 lb. of bombs. It will be equipped with a machine gun mounted directly behind the propellers. The fusilage will be covered with light armor to protect the engine and the crew against bullets from hostile airplanes and against shrapnel from anti-aircraft guns.

As to the rumor in regard to Glenn Martin, all plans are in a tentative condition. According to reports, Charles E. Thompson, president of the Steel Products Co., and Samuel Mather, director of the United States Steel Corp., are connected with the project.

Manufacture of aircraft in great numbers under the aircraft production board has reduced the cost of airplanes half. The probability is that the cost price to the government eventually will be about third of the normal cost of the machine before the plans of the board were carried out.

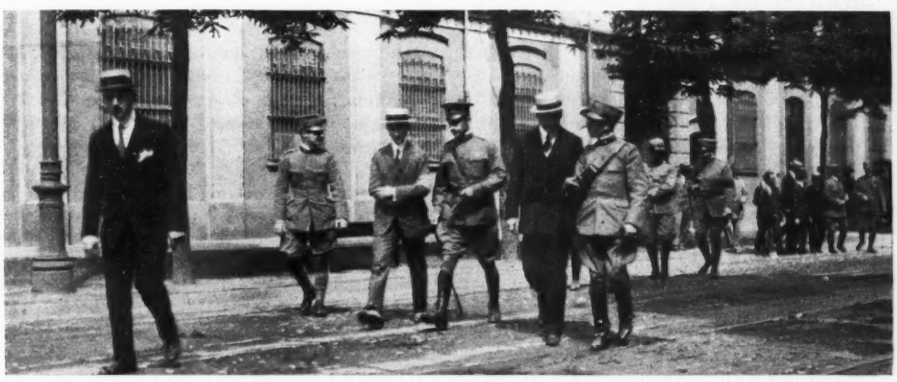
CALIFORNIA TO SHOW TRACTORS

Los Angeles, Cal., Aug. 24—Gasified farming in all its many phases will be shown to the public at the second annual demonstration of the Traction Engine and Implement Dealers' Association of Southern California, which is to be held Sept. 18 to 22. Twenty-seven different firms will be represented and about fifty mechanical aids to the farmer will be demonstrated.

Use of a 350-acre tract of land east of the city has been obtained for the demonstration. It is expected that about 50,000 persons will attend during the five days. There will be all types of tractors from those that simply take the place of horses up to replicas of the huge machines the allies are using to reclaim the fields of northern France wrested from the Germans.

A. A. A. URGES FULL RECIPROCITY

Washington, D. C., Aug. 24—The American Automobile Association, according to H. M. Rowe, president of that body, will not officially make objection to the proposed tax on privately-owned motor cars



Howard Marmon and the military members of the American aviation commission at the Fiat factory, Turin, Italy, on their tour of inspection of airplanes

This is a Citizen's War as well as a Soldier's War

but will insist that the United States senate enact the Adamson-Pittman reciprocity bill "as a long delayed matter of simple justice to many thousands of the four million odd self-propelled vehicle users. President Rowe added:

"We only ask that Congress now open unreservedly the doors of every state to the residents of all other states who in the pursuit of their business and social duties should have the right to move about freely over the roads of their own country. This Federal tax carries with it a recognition of this inherent right, and we must respectfully urge that this question be settled once and for all time at a stage of the country's existence when it is appropriate that such action should be taken."

LANSING FIRMS DO BIG BUSINESS

Lansing, Mich., Aug. 24—Business is unusually prosperous for the Reo Motor Car Co. and the Olds Motor Works. The Reo truck business is taking on greater proportions than it has ever reached before. The Reo speedwagon is being turned out in quantities of more than 300 a week. The passenger car contract for 1918 is the largest ever made by the sales department. Reo dealers anticipate increased business and twenty-five of the largest are engaged in contructing new garages, sales offices and storage buildings that will cost more than $1,250,000.

The Olds Motor Works already is working to triple its capacity. The Olds company, one of the oldest makers of motor cars, has enjoyed a prosperity which has reaped contracts for thousands of cars more than its highest production record.

Both of these concerns have contracts with local accessory makers and the outlook for Lansing business is good.

ST. LOUIS ARRESTS 1599 DRIVERS

St. Louis, Mo., Aug. 27—In a thirty-two day drive against violations of the traffic laws the police department here arrested 1599 motor car drivers. The records show the following classification of the arrests for the thirty-two-day period: Speeders, 226; careless driving, 169; violating traffic rules, 355; having mufflers cut out, 43; dazzling headlights, 29; without chauffeur's licenses, 36; without state license, 27; improperly lighted, 301, and without city licenses, 413.

SHADBURNE PARTY TOURS LAKE

Chicago, Aug. 25—Executives, directors, prominent stockholders of the Shadburne Bros. Co., Chicago, and their friends returned this morning from a week's trip on Lake Michigan, which they took as guests of L. A. Shadburne president of the company. The party left Chicago last Saturday on the North American and sailed to the Soo and Duluth, then cruised among the islands of Georgian Bay, from which it returned to Chicago. The trip was primarily a pleasure event. It served also as a get-together week for the organization, which now has three motor cars in the field, the Shad-Wyck, the Bour-Davis and the Dixie Flyer. Members of the party pronounce it a success from either standpoint.

Wanted: More Tractors

Farmers Also Need Operators for Machines Which Help Solve Labor Problem

One Owner Uses Traction Engine in Emergency

CHICAGO, Aug. 27—There must be millions of acres that easily could be put into cultivation this fall if tractors were available! Such is the indication of the reports coming from the farmers in conference at Kansas City, Mo., on increased grain production. The use of small tractors as an aid to the solution of the labor problem, growing worse all the time, received first consideration at the conference.

The first annual farm tractor demonstration of the agricultural department of Purdue University, Lafayette, Ind., attracted attention that indicated much the same belief among the farmers of the more northern section of the country. Such a large crowd of farmers from Indiana, Ohio and Illinois were attracted to Lafayette the members of the faculty who have charge of the demonstrations had to abandon their program and separate the men into squads for instruction.

The farmers want tractors, but they also want someone to run them and they want to know more about them mechanically.

It had been expected that about seventy-five men interested in tractor farming would attend the demonstration at Lafayette, but more than 300 came. Classes in various phases of tractor plowing were conducted throughout the week. Tractors were assembled, and the men were taught the proper care of the machines. Plowing demonstrations were made under the direction of experts, and each man in attendance was given an opportunity to handle a tractor. The tractors represented at Lafayette were the Case, J. I. Case Plow Works, Emerson-Brantingham, Wallis Cub, Avery, Tital, International, Marshall and Heider.

Tractor Work Hired

In New Mexico the practice is to hire work done by tractors, the soil being turned, planted and dragged in one operation. In Oklahoma—as farmers from elsewhere report of their sections—repairs are sometimes slow in coming and tractor plowing is held up. This difficulty has been overcome by one Oklahoma farmer. Repairs failed to appear, and plowing had to go on, so the farmer had a car of coal sent to the farm for the traction engine that had been used in threshing, and the traction engine proceeded with the plowing at the rate of 25 acres a day, pulling the three plows of one tractor, the four of another and the three which mules had been pulling.

MOTOR AGE's articles on "Designing Farm Tractors" have aroused a good deal of interest among farmers and among those who comment on them is W. J. Spencer, El Progreso farm, St. John, Kan. Mr. Spencer also is looking for a better farm tractor, and says:

In your last article you speak about high-and-low-speed tractors. In my opinion it is not which motor is the most efficient as a motor, but does the high-speed motor or the low-speed motor do the best finished work. By finished work I mean the result after the tractor and implements, whatever they may be, have passed over the field.

I have had some experience with the old steam tractor, and at the present time operate a gasoline tractor of the track-laying type with speeds at 2⅛ m.p.h. and 3½ m.p.h. We have found that our plowing and other field work is most satisfactory at the speeds at which our implements are designed to work—that is, about 2 m.p.h. For instance, we operated two grain drills at 3½ m.p.h. in seeding wheat, and, after seeding 40 acres, found that our drills were nearly wrecked. Also the seed was not as well put in as it would have been had the speed been normal.

Another instance, we can pull three 14-in. plows at 3½ m.p.h. and six plows at 2⅛ m.p.h. At 2⅛ m.p.h. we can plow more in a day with six plows than we can with three plows at 3½ m.p.h.

After operating our tractor for three seasons I know that our transmission will last much longer at slow speed than it will at high speed and that all of our engine plows are made to operate at about horse speed or 2 m.p.h. in the field. Without boasting, I may say that we have been very successful with our tractor, but I can see very plainly that the less complicated and the fewer the parts that go to make up the farm tractor the better. Let me also add that reliability in the tractor should not be overlooked.

High-Pressure Steam Powerplant

You speak of people smiling at your suggestion of a high-pressure steam powerplant for a farm tractor. If the manufacturers only would realize what a powerplant without the many complications of the internal combustion engine would mean to the average farmer, I feel sure that they would endeavor to do something along these lines. I do not believe that the perfecting of a carbureter that will handle kerosene will solve the problem, for we still have the internal combustion engine with its many moving parts.

Also bear in mind that labor on the farms is becoming scarcer and that every progressive farmer is trying to solve the labor problem partly through the agency of the farm tractor. It seems to me that every tractor manufacturer is trying to make a small tractor or something a little different from the other fellow's and each one with its especial talking point.

Before going further I wish to say that I have talked with many farmers in our section of the country on the tractor situation. While some are in favor of the wheel type and others in favor of the track-laying type, some for cheap tractors and some for the better-made tractors, all seem to agree that they want a tractor that will do their plowing, harrowing, listing and other field work, then have enough belt power to run their ensilage cutters and do other belt work.

We are well aware of the fact that a two-plow tractor has not enough power at the belt to drive an ensilage cutter that has any capacity, so it seems to me that if these farmers are to be satisfied they must buy larger tractors than some of them have been buying.

Also when a manufacturer thinks that service just means delivering the tractor on the farm and showing the farmer how to start it, he is far from the mark, for the average farmer will need help from time to time until he thoroughly learns his machine.

Conservation of Man Power

Motor Vehicles Increase Efficiency and Make Greater Individual Production Possible

"MAKING two stalks grow where before there grew but one' never was more justly applicable to anything than to the motor vehicle as an efficiency builder and stimulant in business," said the branch house manager of one of Chicago's leading packing house companies to a MOTOR AGE representative when asked how it would affect the business were the use of motor vehicles denied him. "In the hands of an ambitious salesman the motor car means more intensive working of a larger territory and the motor truck for delivery is indispensible.

"Competition forced us to motorize and we could not give up motor vehicles if we would, nor would we if we could."

Back in the days when the motor car was a novelty and trucks were unknown, the term "pleasure car" had its inception and some of our representatives in congress are laboring under the impression that motor cars never outgrew the term, yet to-day motor cars mean to business almost what electricity means to the world.

Value to Salesmen

Perhaps the salesmen, more than any other class of men, find the motor car of inestimable value in their work. For the city salesman, of course, there are other means of transportation that can be used, but the country salesman who had to depend upon erratic train service often lost much valuable time, both to himself and to his company, before the motor car paved the way for making, in many cases, double the calls he once was able to do. Starting for the next town as soon as he has finished in the town he is in is now possible, where before train service of an uncertain nature often held him over until the next day.

"Our salesmen," continued the branch house manager, "now cover almost twice as much territory as they were able to do before we equipped them with motor cars. If we get a man who looks upon the car as a means of shortening his day, doing only what he did before he had the car, it becomes incumbent upon him to produce more business or give way to someone who will. We find that our men travel as cheaply by car as by train, actual mileage considered, and the mileage they cover with the car often is twice as much and many times more than that, compared with using railroad trains.

"With motor trucks our branch houses are able to serve the trade more quickly and reach towns that before we could give nothing but train service. Furthermore, trucks are less expensive to operate than horse-drawn trucks, for feed and harness are so high now that the expense of truck operation day by day throughout the year averages lower than does the horse equipment, to say nothing in the saving of man power. I predict that in two or three years the packing industry will not be using a single horse-drawn vehicle for delivery of meats or packing-house products."

It does not take a very long stretch of the imagination to see what the United States would be to-day without motor vehicles, especially at this time when a rapid and flexibile means of transporting men and materials is a government as well as a business necessity.

> THIS is the first of a series of articles which show how motor vehicles have increased the efficiency of men, given them a means of doing vastly more work in the same length of time as heretofore, and, best of all, released an army of men that can be used to advantage elsewhere. The motor car is a utility. No longer is its sphere that of pleasure only. Nor does it follow that it is the city man whom it has helped, for the rural population, as well as those with business in the country, but whose place of business is in the city or town, have found it an asset of incomparable value.—Editor.

Railroad freight car shortage promises to be more acute this year than ever before. Just imagine the delay if the hundreds of thousands of tons of goods now being hauled and delivered by motor trucks were dumped on the railroads, likewise the millions of people who, through the perfection of the motor car, are able to travel economically and quickly. Imagine the congestion and confusion that would result if our city streets were minus motor cars and horses and wagons took their place.

The time which motor vehicles save for men increases their earning power and their efficiency. Things are possible now that never were dreamed of a few years ago. Fitting into the scheme of conserving man power the motor vehicle's place is as easily seen as a problem in elementary arithmetic. Thanks to the motor car, railroads have been able to retire accommodation trains on which the passenger travel was almost nil. This has released equipment and men for more valuable service. Business men, by using motor cars, can crowd more work into a day, which means that larger returns come from individual effort. Salesmen, calling on their trade by motor, enlarge the scope of their territory, thus releasing salesmen for other fields and at the same time they can work their respective fields more intensively.

Motor trucks for hauling farm produce carry larger loads in less time, thus giving men on the farm more hours in which to produce. Railroads, taxed to their capacity and more, now find part of their burden shifted to motor trucks. Motor truck hauling of freight keeps warehouses clear, which means that cars can be unloaded more quickly, thus releasing equipment that otherwise might be held indefinitely. It does not help the country any because the consignee of a car load of freight must pay demurrage when he does not unload the car. What is needed most is release of cars, especially at this time when cars are needed as never before.

The community truck has been used to advantage in many country localities. Instances are known of how a motor truck gathers the farmer's milk each morning, takes it to the creamery and returns the cans. Thus one man takes the place of many who formerly were required to move the same amount of milk.

Conservation of man power is imperative in these days of war clouds. Men, money and materials, said a prominent cabinet official, are the three main requisites of the national defense, but MEN MOST OF ALL ARE ESSENTIAL. Every man who can be spared is needed. Those who stay at home must produce as never before and conservation of power will be a leavening force to compensate for those who go to the front to preserve the honor of our country.

SPEEDWAY-MOUNTAIN TESTS

Uniontown, Pa., Aug. 24—For the first time in the history of American motor engineering, mountain and speedway tests are being conducted at the same place under the same atmospheric conditions and under the same temperature, combinations unattainable at any other testing grounds in America. Recognized as the best mountain testing ground in the United States, the Summit Mountain Course, the 6-mile state improved national pike between Hopwood, 3 miles from Uniontown, Pa., and the top of Chestnut Ridge, has been the scene of try-outs for many of the best known cars in the country.

Chalmers cars have been tested out on the Summit course for years. During the last week H. M. Jerome, chief engineer of Chalmers, has been in Uniontown making tests for the company's new standard car which is being put into production and with the approval of the management of the Uniontown Speedway Association has been combining the mountain tests with tests on the 1⅛-mile speedway. The speedway is at the foot of Chestnut ridge, within a stone's throw of the start of the mountain course, and the cars can be driven from the mountain to the speedway or vice versa without the slightest change in the temperature of the car.

What Every Driver Should Know

What sometimes happens when attempting to pass on the right. The leading car has veered close to the curb, forcing the other car over it

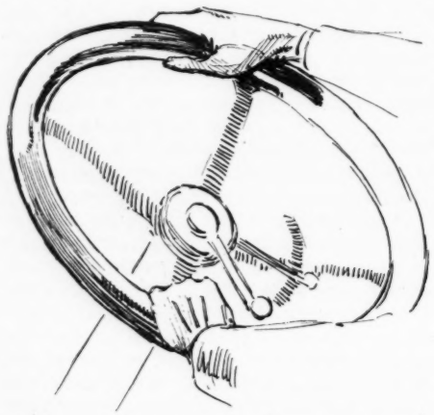
By B. M. Ikert

NO general rule can be laid down as to the manner in which the steering wheel should be held, as each driver will gradually discover that there is one certain way which seems best suited to him. But at that, there are right and wrong ways of grasping the wheel and even those who have been graduated into the ranks of good drivers may find themselves not adhering to the accepted rules. For instance, when the car is going faster than 25 m.p.h. both hands should be on the steering wheel to be ready for any emergency, such as a blowout, passing vehicle or the like. Many accidents are avoided by quick steering rather than bringing the car to a stop or slowing down and the man who has both hands on the wheel in this case is in a better position to worm his way out than if he had to bring the other hand to the wheel. The latter operation requires a second or so and seconds are precious factors when avoiding collision.

How to Hold Wheel

As a general thing the wheel should be held as in the illustration, so that one hand is about diametrically opposite the other. In this position the arms will act as levers and while one hand pushes the rim the other pulls. On long drives and where the road surface permits, this position may be varied so that the driver becomes less fatigued. Some people drive by placing both hands close together at the bottom of the rim so that the arms are straight back. This is bad because it affords little leverage. Then there are others who grasp the spokes of the wheel and while this is permissible for resting the arms, it must be borne in mind that the closer the hands are placed to the center of the wheel, the less will the leverage be. The safest way is to place the hands at each side of the wheel, so you are ready for emergencies. There is no telling when a tire is apt to blow out and if the car is travelling over 30 m.p.h. the wheel may be jerked from the hands of the driver if he is unprepared. Most steering gears are irreversible, but at that a blowout at comparative high speeds will in most cases force the front wheels to the side on which the blowout took place. It is also well to remember that when a tire blows not to jam on the brakes, but rather the throttle should be closed and the car allowed to coast to a stop. By jamming on the brakes, the car might skid and serious damage will result to the deflated tire.

While on the subject of skidding, it is perhaps well to take up a discussion of the latter.



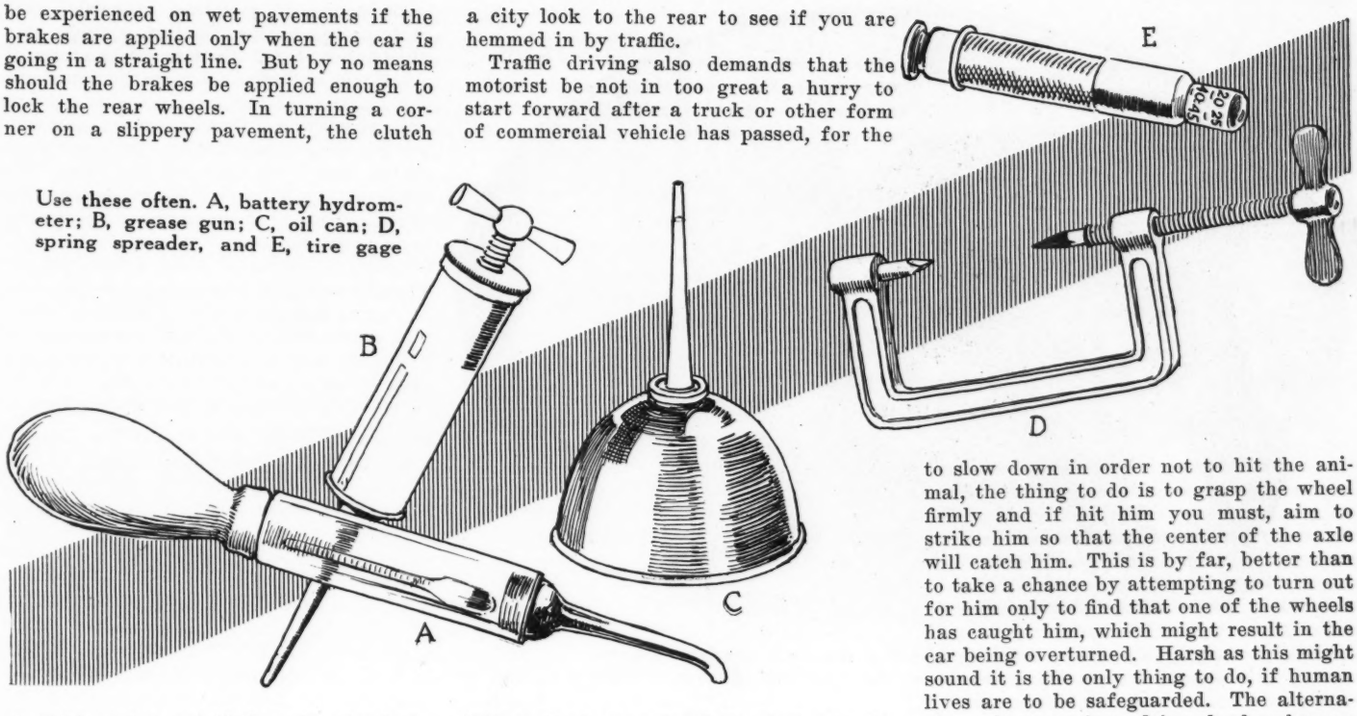
Method of holding the steering wheel for proper control

To begin with the driver should learn to differentiate between the term skidding and side-slipping. The former simply means a continuous forward movement of the car with one or more of the wheels not turning. Side-slipping, on the other hand, is self explanatory and means a lateral or sidewise movement of the car. Fortunately side-slipping is usually confined to the rear wheels only, but in some instances this might be true of the front ones also. One reason for side-slipping is taking corners too fast. In this case the centrifugal force tends to slide the car broadside off the road. The driver who experiences his first skid or side-slip feels helpless, but after one or two of them he will learn how to correct them. Nearly all side-slips are toward the right, made so by the camber of the road or city street. Application of the brakes in such a case will only aggravate matters. The thing to do is to partially close the throttle; but not all the way as this would be equivalent to putting on the brakes. Then gradually head the car for the center of the road, at the same time opening the throttle. This might aggravate the skid somewhat, but it will be for a short time only and all the while you are placing the front wheels in the center of the road with the car pointing at an angle.

What to Remember

In this manner, the car can be brought to the crown of the road again and the right rear wheel, which is down in the ditch, will be pulled out by the momentum of the car. The important thing to remember about skidding is to leave the brake pedal alone. No great deal of trouble will

be experienced on wet pavements if the brakes are applied only when the car is going in a straight line. But by no means should the brakes be applied enough to lock the rear wheels. In turning a corner on a slippery pavement, the clutch should be taken out if there is a tendency for the car to slip.



Use these often. A, battery hydrometer; B, grease gun; C, oil can; D, spring spreader, and E, tire gage

There is another cause of side-slip which might take place when the car is being driven in a straight line. If the brake be applied hard one or both of the wheels may become locked and the car skid in a straight line. When this takes place very frequently one of the rear tires, especially if it has a plain tread, will lose its lateral grip on the road surface and begin to slip sideways, setting up a possibility of the car being swung up against the curb. Never steer a car sharply from the curb to the crown of the road when the surface is slippery. This is also true when the car is started from the curb. The theory back of this is simple; the adhesion of the road wheels is insufficient to overcome the centrifugal effect and the result is that the rear of the car is forced into the gutter. Sometimes a sudden speeding up of the engine will effectively overcome the tendency to skid.

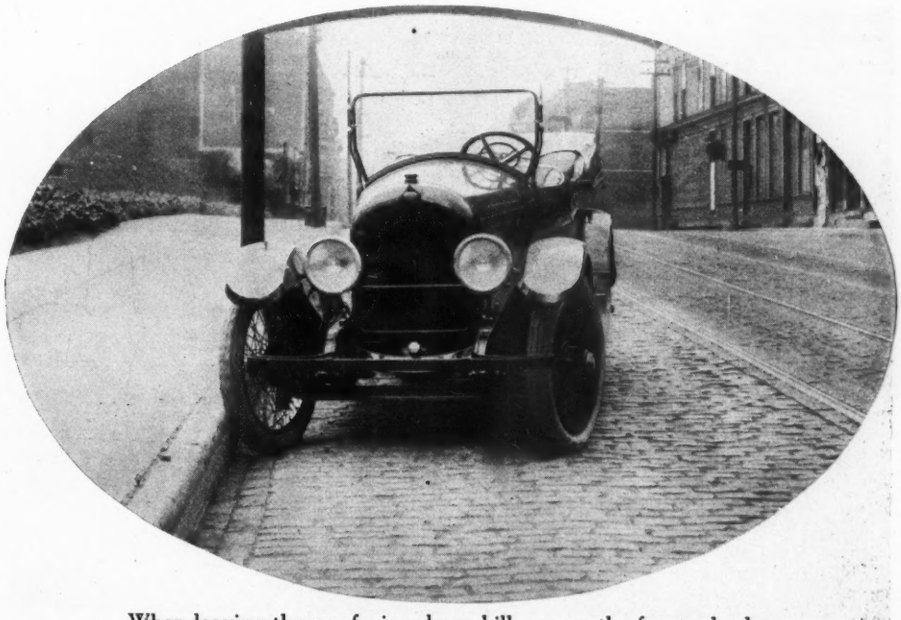
City Driving

Driving a car in the city through traffic calls for quick manipulation of the steering wheel, brakes, gears, etc., much more so than when in the country. In the city the driver must be on the alert at all times owing to the increased number of vehicles met, street cars, pedestrians, etc. One of the first things to learn in traffic driving is not to get up too close to the car or vehicle ahead of you, especially if it is horse-drawn. Horses become restive at times, sometimes from their own caprice, at others because of an unskilled driver and have a way of backing up in stopped traffic. If a car is driven to within 6 in. or 1 ft. behind, the result is usually a broken lamp or fender, or in some cases even the radiator might suffer. The careful driver leaves plenty of space between his car and any vehicle in front, so that in case the latter starts to back up, the reverse can be used, and the car brought back to a point of safety. Always before backing the car in a city look to the rear to see if you are hemmed in by traffic.

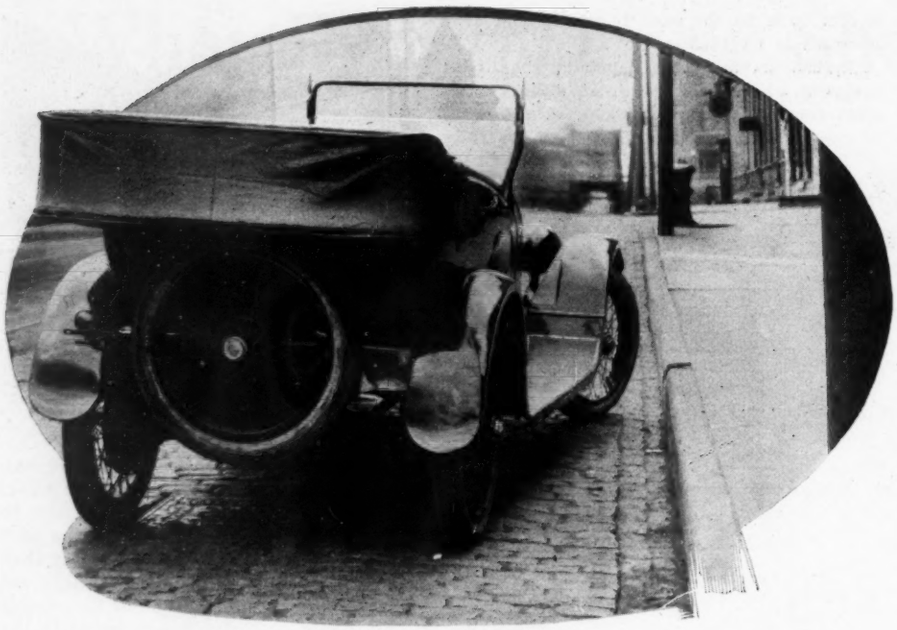
Traffic driving also demands that the motorist be not in too great a hurry to start forward after a truck or other form of commercial vehicle has passed, for the latter may be carrying long pipes or rods, lumber, etc., all of which may result in damage to the front of the car, if not an accident all around. It is especially bad when a dray has but one of the protruding articles, inasmuch as the latter will then be much harder to see.

A common everyday occurrence which befalls car owners is that of having a dog running alongside of the car and at times darting out ahead of the machine. No attempt should be made to dodge the dog, inhuman as it sounds, for in nine cases out of ten the dog will take care of himself and it certainly is not worth the risk to start dodging the miscreant for a sudden swerve may result in disaster. Occasionally a dog in the country will dash out from a farm yard and make for an approaching car. If the car is going too fast to slow down in order not to hit the animal, the thing to do is to grasp the wheel firmly and if hit him you must, aim to strike him so that the center of the axle will catch him. This is by far, better than to take a chance by attempting to turn out for him only to find that one of the wheels has caught him, which might result in the car being overturned. Harsh as this might sound it is the only thing to do, if human lives are to be safeguarded. The alternative, of course, is to drive slowly when an infuriated animal is seen charging a car.

Never attempt to pass a car or vehicle on the right when going in the same direction. The other fellow might take a notion to drive closer to the curb suddenly, to which he has a perfect right, and you find yourself in imminent danger of either hitting him or being forced onto the sidewalk. It pays to play safe in a case like this and even if the car in front leaves an inviting gap between it and the curb for you to dash in to, better sound your horn and make him swing over so that you can pass him on the left side as the rule of the road says. If you decide to leave the car by itself on a hill in the city, cramp the front wheels in such a way that if the car should start to back down the hill, its progress would be arrested very soon by



When leaving the car facing down hill, cramp the front wheels so it cannot run away, should the brakes not be set



When the car is left facing up hill at the curb, the front wheels should be in this position so the car will not run away

the angularity of the front wheels. The illustrations make this point clear.

So many accidents take place at grade crossings that a word might be said regarding them. In most cases the driver becomes confused and stalls his engine when he notes the approach of a train and opens the throttle too quickly or lets in the clutch too violently. The correct procedure is to come into second gear before the track is reached, especially if there is a slight approach to the latter, proceeding carefully, in the first place to see if there is a train coming and secondly to be in shape to accelerate the car sharply without the danger of stalling the engine. Every now and then the driver finds himself running in a deep rut or street car track from which he is trying to emerge. Less chance of skidding, accident and prolonged life of the tires will result if the car is driven out by giving the front wheels a sharp turn. Under no circumstance should the front wheels be allowed to ride along the edge of the rut or track. You may have the steering wheel over further than you think and when the car finally jumps out, the front wheels will be at a critical angle to the line in which the car is proceeding and the latter will head for the ditch on the other side.

Learn to drive your car by ear; the latter is one of the best judges of whether or not an engine is up to standard. A trained ear can instantly detect a change in the steady and continuous throb of an engine. The driver should bear in mind that when there is a squeak that takes place at regular intervals, it is quite likely to be in one of the revolving parts, while if it comes at different intervals, such parts as the brakes, fenders, springs, etc., can be suspected. Continuous handling of a car will so train a person that any new noise in the chassis or body will become at once noticeable. This is one reason why one car of a certain make will outlive a similar model; the owner of the former has been on the alert for little things that might get out of adjustment and has sought to remedy them while they were still embryonic. Everyone who drives should learn to recognize the noises coming from an engine that is in perfect running order, such as the hum of the timing gears, clicking of the valves, etc., so that if any other unusual noises are produced, they will be immediately disassociated with the former.

Driving Helps

The car manufacturer has met the motorist more than half way in seeing to it that his product is properly handled, for he has placed on the instrument board of the modern car all sorts of little tell tales to inform the negligent driver that his car is in need of oil, that the electric system is not functioning or that the fuel tank needs replenishing. The beginner is apt to look at the array of instruments in utter dismay at first, but gradually as he learns what they are for he will use them as a matter of course. All of the devices put on the dash of a car are there for some good reason and it is up to everyone who handles that car to have a clear conception of what they really are for. The illustration on the bottom of this page shows the arrangement of the instrument board on a Marmon car.

To begin with, A shows a typical form of stem wound clock which, while it has nothing to do with the actual running of the car, is nevertheless very useful, a fact probably apparent to all those who drive with a timepiece on their dashboard. At B is shown a gasoline gage which tells at a glance the amount of gasoline in the tank. Obviously when the pointer gets near the zero mark it is time to refill. The cowl or instrument board light shown at C illum-

Layout of a modern instrument board, showing the devices which tell the owner if his car is performing at its best

inates the instruments at night and usually is wired in series with the tail light so that if the latter goes out, the driver will be aware of it by the failure of the instrument board light. In other words, if the cowl light goes out, the fault may be in the tail light and this should be looked at first. This arrangement prevents arrest at night for driving without a tail light.

The oil gage shown at D shows the pressure of the lubricant in the engine. Usually there is an oil pressure regulator on the engine which is interconnected with the throttle lever so that the amount of oil fed to the engine is reduced when the throttle is closed. The regulator is usually set so that the pressure on the gage will be about 1 or 2 lbs. when the engine is running idle. The maximum pressure is governed by the regulator and generally amounts to about 15 or 20 lb. when the car is going, say, 30 m.p.h. Hence, if the car is going at this speed and the oil pressure gage reads 5 or 6 lbs. it immediately tells the driver that his engine is being starved of oil and the regulator in need of adjustment.

Speedometer and Ammeter

Every motorist is familiar with the conventional speedometer and what it is for, therefore it will not be necessary to discuss it here. The speedometer in the illustration is indicated by E.

At F is shown one of the most important instruments on the board, the ammeter. A trained eye can tell by looking at this instrument whether all is well with the electrical system. Really, the ammeter is the pulse of the electric system, and is an indication of the condition of the system just as the pulse of a human being is a check upon the condition of that person. If a car was traveling at say, 25 m.p.h., and the hand of the ammeter remained at zero, it would indicate something radically wrong somewhere. When the pointer of the instrument swings to the right it shows that the battery is being charged and to the left, that discharge is taking place. If the pointer does not come to absolute zero when at rest, there is a possibility of a short circuit in the line. The ammeter tells much and it is well to watch it all the time.

At G is shown the ignition switch, the same being also used to turn on or off the lights. Two other important devices are shown at H and I and a proper understanding of these will result in smoother as well as more economical running of the engine.

The carbureter auxiliary control H when pulled out allows a richer mixture to be drawn into the cylinders for starting purposes, but should be pushed in after the engine gets warm. The air adjustment for the carbureter shown at I supplies auxiliary air for the engine and there will be a great amount of difference in the gasoline bills of the man who uses this device wisely. When running along on a level the air control I should be pushed in all the way, so that the engine is running on a lean mixture. Then, when a hill is approached or the pulling becomes hard for some other reason it might be well to give the engine a slightly richer mixture and this is done by pulling out the air control button I a little. When too much air is given to the carbureter in proportion to the gasoline, the engine will sputter if the throttle is suddenly opened and seem to be running light. By this is meant that the engine while running fast enough, seems to lack the punch of a somewhat richer mixture. For continued long runs on the road at speeds of 25 or 30 m.p.h. and where there is no need of quick acceleration, a mixture that is very lean will go a long ways toward reducing the consumption of gas.

Along with the last mentioned device may be stated the fact that more economical running will be secured by using the hand throttle in preference to the foot accelerator. Going over rough spots invariably results in a slight rocking of the foot if it is holding down the accelerator pedal, thus giving the engine momentarily more throttle. If the clutch pedal is partially held out at the same time, the engine will race slightly under the influence of the accelerator and thus give it all the more chance to use up precious gasoline. When driving in the country and city where the traffic is light, use the hand throttle. Drivers of cars in gasoline efficiency tests always use the hand throttle. The foot throttle is handy in traffic driving but in these days of economy, when it is essential that every motorist help to conserve the gasoline supply, it should be resorted to only when necessary. Besides, there is a much smoother action of the car when the hand throttle is used, because it is possible to gage the throttle opening better, with less likelihood of dumping the throttle so often caused by the foot coming down suddenly on the accelerator.

First of All

But remember, first of all, to be a good driver you must understand the mechanism of your car. To do this you must have a working acquaintance not only with the external appliances of driving, but with the minor repairs at least of the mechanism. These every driver should know.

The car used in the articles on driving in this and last week's issue is by courtesy of the Chicago Marmon agency. A Roamer assisted in the dual picture.

NOTES OF A GOOD DRIVER

Before you start: Look to the water, oil and fuel supply.

Take your time in shifting gears; your car will be better for it.

Use both brakes; the lining will last longer.

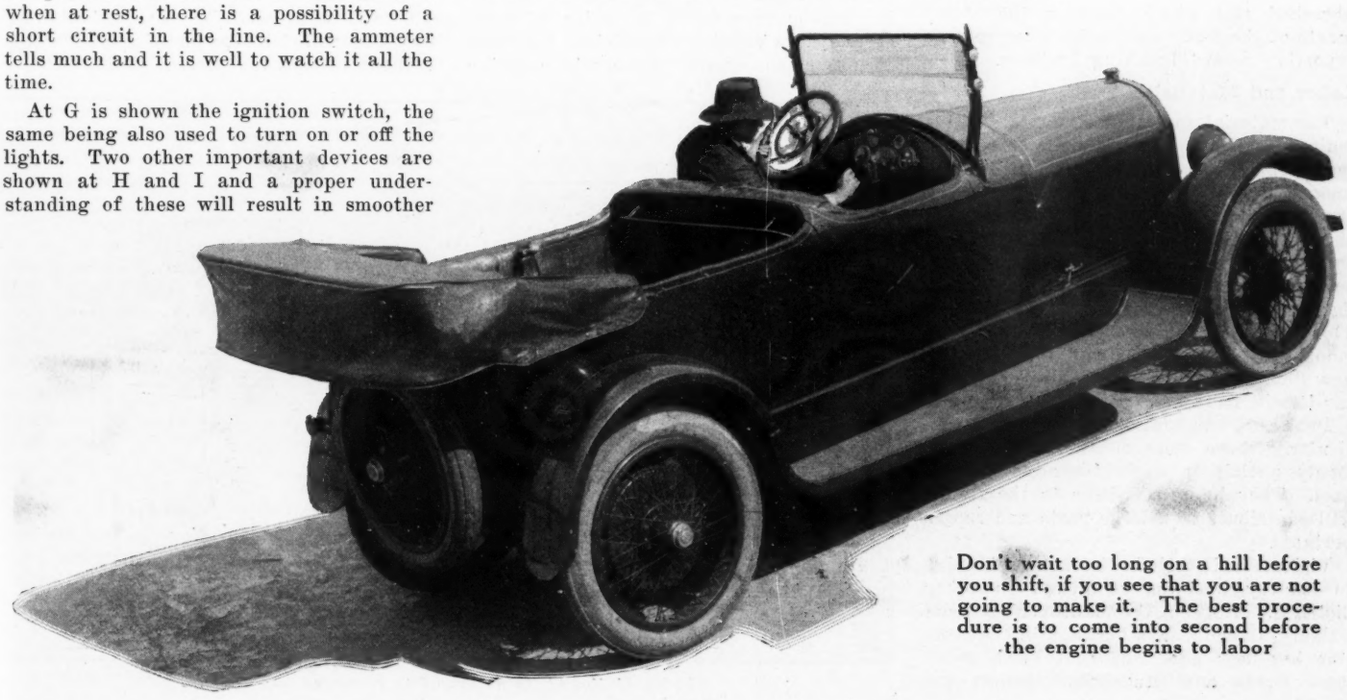
Shift early on a steep hill; you are doing your car a favor.

Never look down at the pedals or gear lever; it may result in serious mishap.

Coast the car over road irregularities; it conserves engine power.

Don't brake with the clutch in when going slow; you might throw the crankshaft out of line.

Avoid excessive slipping of the clutch; the lining or plates will need less attention.



Don't wait too long on a hill before you shift, if you see that you are not going to make it. The best procedure is to come into second before the engine begins to labor

Car Production and Sales Gain

Orders for Cars at Popular Prices Continue to Demand Quantity Production in Most Plants

DETROIT, Aug. 27—Orders continue to arrive for cars of popular price in quantities that demand production capacity in most plants. Despite the fact that fifty-one manufacturers of motor cars have increased their prices and that gasoline has increased in price business prosperity continues at such proportions that makers and dealers throughout the country are becoming optimistic. At the same time, however, manufacturers are displaying caution in anticipation of the future and are passing dividend declarations to insure sufficient working capital if conditions resulting from the war justify. The Packard Motor Car Co. has had an increase of 19½ per cent in passenger car sales for the first four weeks of the new season over the same period last year. Franklin Automobile Co. is producing three times as many cars as six months past and is breaking shipment records almost daily. These are conditions that are prevalent with all manufacturers of cars selling at $1,500 and less and in some instances as high as $3,500.

The Timken Detroit Axle Co. is displaying a substantial gain over last year. In the first half of 1917 the Timken Detroit Axle Co. reported gross sales of $11,500,000 as compared with $18,000,000 for all of last year, an increase of 25 per cent. During these last six months the demand for axles for passenger cars decreased considerably as compared with the corresponding period of 1916 while the axles for trucks greatly expanded. Since July 1 the company notices a substantial increase in the demand for passenger car axles, which seems to show that the shock of the war has been absorbed and which confirms the statements of the many companies who are now reporting record breaking business.

Labor and Materials

The material and labor situation still remains unsettled. Materials are constantly increasing in price and labor because of the uncertainty of the draft and because of the increasing demands effective in the last thirty days is proving a difficult problem. One concern which plans to produce a small car commenced its design and plans four months ago basing its selling price at $800. This has been increased within the four months by 50 per cent and the company now finds that when it announces the new car it will have to charge $1,200 or more.

Dealers throughout the country and particularly those close to the new cantonments anticipate an extraordinary business. They believe visitors to the camps will contribute to a large parts and repair business.

Visitors in Detroit in the last week point to healthy business conditions in other districts. Eugene Crandall, dealer from Calgary, Canada, says business in that section has been good and that Ford, Overland, Buick and Studebaker dealers are having difficulty to fill their orders. G. O. Catlin, Hupp representative in South Africa, who has just returned, says business conditions in that country are breaking all records.

PREST-O-LITE IN MERGER

New York, Aug. 27—The merger of the Prest-O-Lite Co., the National Carbon Co. and the Union Carbide Co. has been completed. It is expected that the Air Reduction Co. will be added to the group soon. Tentative terms call for the formation of a new company with either $200,000,000 stock, consisting of $100 shares, or of 2,000,000 shares of no par value. Union Carbide stockholders will get 2½ shares of the new stock for each of its shares. National Carbon stock will be exchanged share for share, and it is proposed that Air Reduction stockholders should get 1¼ shares for each share of their stock. Prest-O-Lite will get two shares of the new stock for each old share.

There is talk of adding still another company, probably the Linde Air Products Co. The entrance of this company into the group, it is stated, has restricted the negotiations concerning Air Reduction, as these two companies produce similar commodities.

MOTOR PROSPECTS IN FRANCE

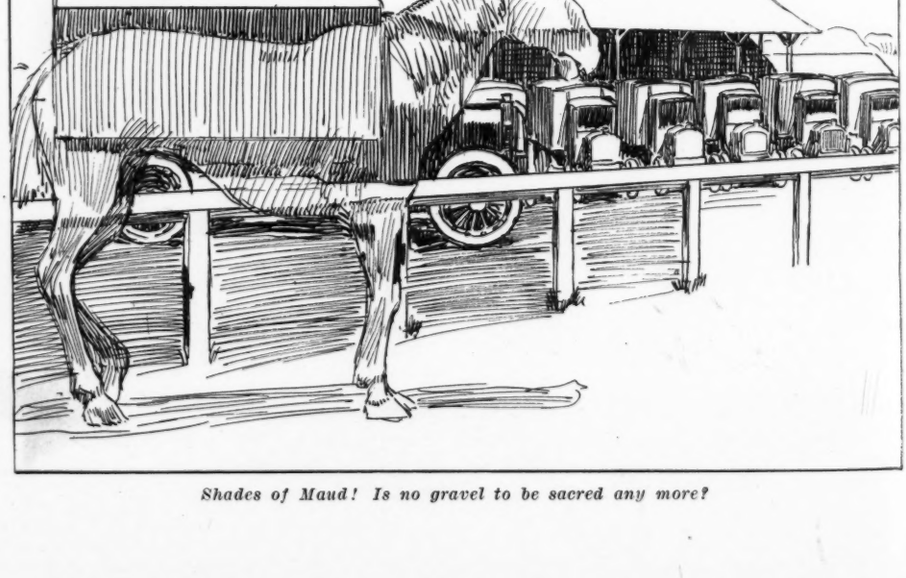
Paris, France, Aug. 1—The appearance on the streets of St. Etienne of many light trucks made from discarded and old-style motor cars, together with a continually increasing number of trailers, forecasts a wider use of these vehicles after the close of the war and consequently further opportunities for makers of this type of truck.

While large trucks of French and American make are used often for heavy hauling, these rebuilt trucks foreshadow the use of the heavy trucks which have been salvaged by the War Department and repaired or rebuilt for the market at low prices. The city of St. Etienne has pur-

War Trucks Usurp Dobbin's Sacred Realm

CHICAGO, Aug. 24—Just as the march of civilization and progress forced the Indian tepee toward oblivion, so are motor trucks encroaching upon the realm of Old Dobbin. Not only for hauling is this true. Old Dobbin and his long-eared half-brother once did yeoman duty on the field of battle, but horses of steel have pushed them back far from the scene of conflict and now comes the crowning ignominy for the equine. The U. S. Quartermaster's depot, Central Department, has leased the old Hawthorne race track in which to store army trucks pending requisitions for them at the various camps. Here, where equine met equine in days agone to battle for supremacy, the motor truck has usurped sacred ground. All is fair in love and war.

Truck factories are turning out chassis on orders recently placed by the war department in quantities greater than the service actually demands at present and Lieutenant Ecker of the central department Quartermaster's Corps found temporary storage of these trucks a problem. Lease was taken of the old race track and while at present only the space under the stands is being used for storage, buildings may be erected if the question of storage expands beyond the present limits.



Shades of Maud! Is no gravel to be sacred any more?

chased lately a fleet of trucks for the transportation of merchandise to expedite deliveries and relieve railway congestion. The excellent roads of France make distribution in the country districts with the vehicles an easy matter.

The light delivery motor truck of the American type is practically unknown here as yet. Six different makes of the standard low-priced American car are seen continually on the streets, however, and the prospects are the light trucks will follow closely.

For American makers to develop a market a central headquarters in France, with either a branch of an established French agent at the head, demonstrating and distributing the line and carrying out an introductory campaign, is necessary for the best results in this prosperous section of the country.

WILLYS-OVERLAND CONGRESS

Toledo, Ohio, Aug. 27—The Willys-Overland, Inc., will hold what it terms the John N. Willys retail sales congress at its headquarters in Toledo during the first week in September. The coming congress will deal to some extent with manufacturing efficiency and principally with sales increases and will be directed mainly by Mr. Willys. Plans were laid several months ago for the improvement of sales, and retail salesmen of Overland and Willys-Knight cars in every part of the United States were grouped in classes to establish individual sales records for a three-month period. Three hundred of the thousands of contestants were given the opportunity to act as delegates to the congress on a basis of personal performance.

No financial credit accrued, the plan being based on the element of honor and distinction gained. The contest closed Wednesday, Aug. 22, and announcements now are being made throughout the country naming delegates to the congress. The visitors will make an inspection of factory facilities, and receive cups and trophies and then participate in a Great Lakes cruise aboard the chartered steamer South American.

Jordan Dealers Meet

First Annual Convention Held as New Models Are Added to Line

Demand Causes Drawing for Orders of Cars

CLEVELAND, Aug. 25—Fifty dealers have been assembled here for the last two days, holding the first annual conference of the distributors of the Jordan Motor Car Co. The distributors have been brought together to view the complete line of inclosed body jobs and to take orders for the coming season. At the same time a general sales conference has been carried to infuse the members of the sales organization with the basic ideas upon which the Jordan cars are sold. The sales conference is in many ways unusual, in that it was notably a gathering of men who have been in the selling end of the motor car industry for a great many years. There are some present who have been selling cars for fifteen to seventeen years, and most of the other distributors are veterans.

One of the keynotes of the conference is the confidence expressed by the majority of those present in business conditions for the coming year. The opinion of the majority, according to statements both in and out of the conference, is that the period of uncertainty is past and that a greatly augmented volume of business is expected. This opinion was backed up by orders for closed cars for the coming fall period, to such an extent that the possible output of the Jordan factory was exceeded, and it became necessary to draw for the closed bodies by a system similar to that employed in the draft for the National Army. Each of the cars of the closed type to be turned out within the early fall period was given a serial number and these numbers were placed in a jar, being drawn by an uninterested party. The number of chances that each dealer had to draw, corresponded to the number of closed jobs he had ordered, and this way everyone was given an opportunity in proportion to his order, so that equal fairness to all resulted.

The evident demand for closed cars of the sport limousine, brougham and sedan types was one of the features of the sales conference. An interesting sidelight on this is the percentages of these cars as selected by the different dealers. Taking the local number desired by each, it was noted that of the closed cars, 40 per cent were sedans, 33 per cent broughams, 17 per cent sport limousines, and 10 per cent town cars.

The attitude of the dealers toward the closed cars is of interest. Some of the dealers look upon the closed cars as a trade builder with which it is possible to establish a clientele, which is afterward of great value as the foundation of an open car trade. Carl Page, Jordan dealer for New York, made the remark that he would, if he had to, be willing to sell closed cars all winter without profit, simply to build up his open car trade in the summer. The used car department was discussed, and the dealers suggested ways to success. It developed that some of the most successful dealers had a man who handles their entire used car department on a salary and commission basis, and that if this man has the chance of selling a new car he is allowed to do so as the other salesmen. The importance of getting a good used car man and giving him ample compensation for his work was emphasized by C. E. Baker, who handles the Jordan line in Detroit.

Used Car Show Indorsed

Mr. Baker and many others indorsed the idea of the used car show, stating that it not only helped to get rid of used cars quickly but at the same time had no appreciable effect on the used car market afterward, that is, the same number of cars were sold after the show closed as before it opened.

One distributor who has a large territory had an interesting point to offer, and that is that it is necessary for the distributor to get around and visit his dealers frequently and the best way to go is by taking one of the cars and driving it.

E. S. Jordan closed the conference with a discussion of the objects of the Jordan line and called particular attention to the fact that the Jordan colors are not of a custom nature, as is usual in stock products, and also particularly to the line of custom style closed bodies.

MAXWELL OFFERS U. S. CARS

Washington, D. C., Aug. 24—Walter E. Flanders, president of the Maxwell Motor Co., Detroit, has placed at the disposal of the War Department the company's road engineers and the use of cars for transporting troops to cantonments and camps. The offer was made by P. C. West, representing the Maxwell company, who brought to Major General W. A. Mann, chief of the Militia Bureau, a letter from Adjutant General L. W. Stotesbury of the New York National Guard suggesting the transportation of guardsmen by motor car.

Motor Industry's Twentieth Birthday

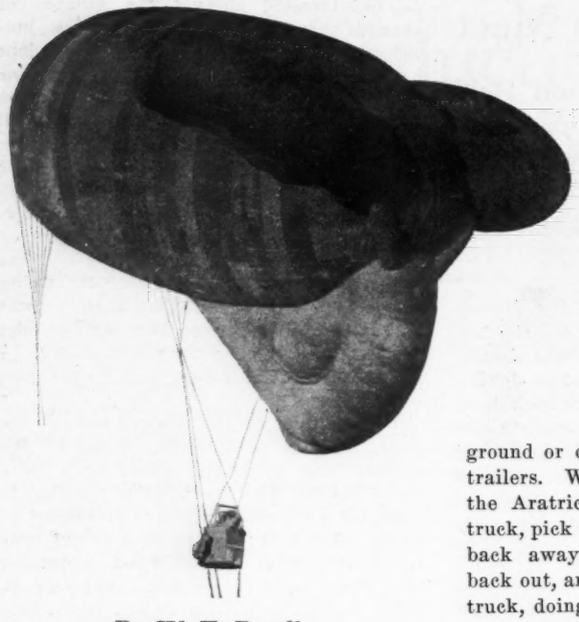
CHICAGO, Aug. 27—Some fitting celebration of the motor car industry's twentieth birthday seems in order, and a suggestion has come from the Winton Co., Cleveland, Ohio, with perfect propriety, for pride in old age is certainly a most excusable vanity. All that now remains to be done is for the motor fraternity to determine of what the celebration shall consist.

It might be a banquet during the New York or Chicago shows of pioneer builders of cars or a special exhibit of 1898 models. Who would not be anxious to receive an invitation to a banquet at which Alexander Winton, Elwood Haynes, the Apperson brothers, Charles E. Duryea, Henry Ford and other motor car men of that vintage were the guests of honor.

The suggestion of an anniversary celebration is interesting, incidentally because of the fact that the Winton Co. began what it claims to be the first regular output of American made cars on April 1, 1898. The company's venture has been successful, notwithstanding the date of beginning. In 1898 the output was twenty-one cars, while the following year 102 cars were made of which eleven were light trucks. Of the two years' output, New York bought 32, Pennsylvania 32, New Jersey 11, Ohio 9, Connecticut 7, Illinois 6, Ontario 5, Indiana 4, Massachusetts 3, and the other fourteen were sold in scattering localities.

Numbered among the 123 pioneer purchasers were William Rockefeller, Harry Payne Whitney, Lawrence Waterbury, Larz Anderson, J. W. Packard, J. M. Studebaker, Harry Rogers Winthrop, George W. Childs Drexel, Albert C. Bostwick, and Josiah Stanford.

Just how rapidly the industry grew may be judged from the fact that at the first show in the Madison Square Garden in 1900 thirty makes of cars were exhibited. Two years ago there were 31 makers still surviving of those who were in existence in 1904.



Tractors for Hauling Artillery

Allies Find Powerful Machines Advantageous for Quick Movement of Guns

In Two Parts—Part II

By W. F. Bradley

NO tractor is complete for war service unless it possesses a powerful winding drum. The Aratrice not only possesses this drum, but has a demountable crane, the head of which is 20 ft. from the ground, designed to be readily attached to the front portion of the chassis. The crane will lift a load of 5 tons, thus it is capable of picking up an empty tractor and moving away with it. This fitment is remarkably valuable for work at the front. The uses which most readily suggest themselves are accidents when a car or truck falls into a ditch or deep hole. A touring car completely overturned in the ditch can be lifted right out and placed on the road in a few minutes. An empty 3½-ton truck can be treated in the same way; while if loaded the cargo can first be removed and then the truck lifted out. In actual practice, however, this crane is most commonly employed at railroad depots. Frequently there are no quais, the goods depot merely consisting of rails laid in a more or less open field. In these cases the Aratrice can unload from the railroad trucks to the ground or direct from a truck to its own trailers. With a skilled driver in charge, the Aratrice will head up to a railroad truck, pick up a load by means of its crane, back away, swing round to the trailer, back out, and again head up to the railroad truck, doing the work in considerably less time than is possible by hand labor.

Another valuable field of usefulness is helping to get guns into suitable positions free from enemy observation. These positions are the most eccentric imaginable: a deep gully, a clearing in a thick wood, the base of some precipice, all of them positions into which a gun can only be dropped with the greatest of difficulty without the aid of a crane. It is common practice for these tractors to haul and place into position guns as big as 305 mm.—12 in. In an hour and a half one tractor is capable of placing in position an 11-in. gun which could only be placed by an experienced artillery crew aided by horses after one day's hard labor. On the higher peaks of the Italian Alps very little use can be made of infantry, but a very important role is played by artillery. The Italian military authorities have long realized that the only means of providing rapid and reliable transport of such heavy guns as the 8.6, the 11-in. and the 12-in. is by means of gasoline tractors of the Aratrice and Fiat types. In this sphere of military operations the horse is an ignored factor.

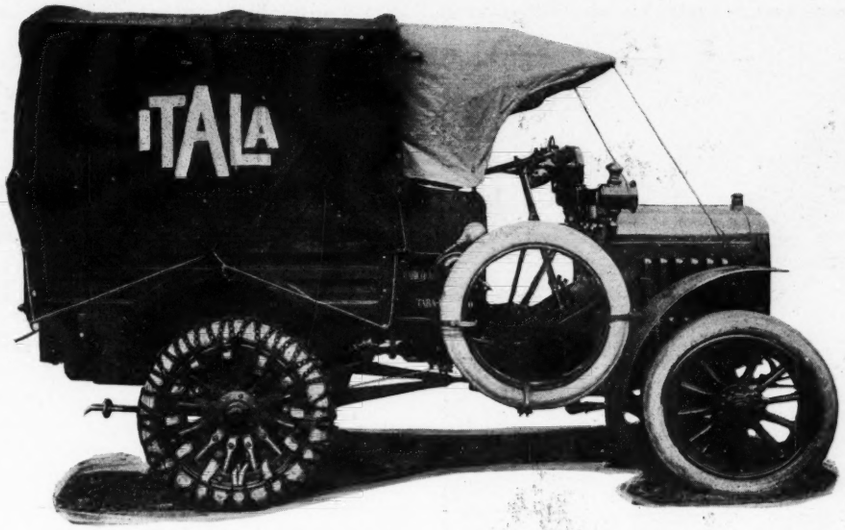
Big guns being moved by means of tractors, it almost follows that ammunition should be taken to them in the same way. For this purpose trailers are employed, one of the most popular types being a Pavesi & Tolotti invention of a four-wheeler capable of being hauled from either end. The wheels are a special thick wire spoke type attached to a rim which may be described as roughly resembling a rim for pneumatic tires. The edges in contact with the road surface are solid, and not hollow.

A rather important service performed by the Aratrice tractor is the clearing of snow off Alpine passes. Three special plows are fitted, one in front of the steering wheels, and two diagonally between the steering and the driving wheels. It is found that with this powerful plow it is possible to keep roads open which otherwise would be snowed up and closed to all but sleigh traffic.

Since the battle of the Marne armored cars have not been used on the Western front to anything like the extent popularly imagined by the American public. A little reflection, indeed, would have shown that with troops deeply intrenched and a practically immovable line there would be very little opportunity for using vehicles of this nature. It is only when one side gets the ascendency and the enemy is actually on the run, that the usual type or armored car can do really effective work.

One of the most successful types used

Artillery observation balloon about to ascend. It is controlled by gasoline motor



Italian light truck equipped for cross-country conditions

by the Italians is a 35-hp. Lancia with a four-cylinder engine of 4.3 by 5.1-in. bore and stroke. The chassis is practically standard, experience having shown that there is no need for a special construction for this class of work. It has neither double steering nor special reverse, being really the standard chassis with electric lighting and starting, twin pneumatic tires at the rear, and steel disk demountable wheels. The body is quite special and is not the work of the chassis maker at all. It has a single compartment with a couple of revolving turrets mounted on ball bearing, the lower turret carrying two machine guns and the upper one a single gun. The whole car is armor plated, the protection, extending over the engine and the radiator, and consisting of 5 or 6 mm. chrome nickle steel capable of turning a rifle or machine gun bullet at short range. The rear tires are incased so that they are practically bulletproof, but the front wheels are usually left without any protection, it having been found that the steering is rendered heavy by this extra weight of metal directly over the front axle.

Interior Arrangements Compact

The interior arrangements are wonderfully compact and well thought out, the center of the floor being occupied by the circular section gasoline tank with spare tires around it. The top of this housing serves as a very convenient platform for the gunners, and of course the tank is in a position where it is least likely to be hit. The driver is the only man who has a special seat. He is on the right-hand side of the car, and has a variable lookout through the adjustable steel dash. On his right is a lookout, with a mirror ahead of it, to be made use of for reverse driving. Practically no wood is used in the construction of these cars, everything being of steel, and the vehicle therefore being practically indestructible by fire. The driver has the whole of his instruments neatly mounted on the dash, and although there is a starting crank the electric starter is a very important, if not an invaluable accessory. Most of these cars are fitted with optical telegraphy, and of course signal by code.

It is usual to carry a crew of six men, all young volunteers selected for their experience in motoring and for their dash. While vehicles of this kind have nothing to fear from rifle bullets and can withstand a considerable amount of shrapnel, it is most important that they be handled by men of nerve and experience if they are to be of use to their own army and are to keep out of the hands of the enemy. These men are specially trained to act quickly in all kinds of emergencies; particular attention is paid to practice in reverse driving at speed with no other guide than a mirror placed on one of the wire cutters or the side of the car. On good roads the cars can touch 53 miles an hour, and on long runs will easily average 25 miles an hour. While the driver and officer in charge must have dash, it is essential that the former be possessed of unusual judgment and skill, so as to know immediately what to do when the thousand and one unforeseen circumstances are met. Practically the only thing these daring crews fear is allowing the car to drop into a hole or ditch so deep that it cannot get out under its own power. It depends on the driver to keep out of such positions. With the enemy wavering or already in retreat, a few armored cars of this type have a most demoralizing effect. Where these cars operate in sections, it is usual to have a similar car, without guns, for bringing up ammunition.

One of the few picturesque sights in connection with the war is a string of drachen or "sausage" balloons lazily floating in a clear sky against a background of snowcapped mountains. They are the eyes of the artillery, being used to report the effect of shells to the batteries to which they are attached. The Germans were the first to make use of these special balloons on a big scale for artillery observation, but their use has now become very common to all the armies in the field. Without these captive balloons the work of the heavy artillery would be much less accurate, for these balloon observers can remain in much closer contact with battery commanders than is possible with airplanes.

Motor vehicles play an important part in the carrying out of observations from captive balloons. Each balloon has attached to it a special motor car—in the Italian army it is a 3½-ton Fiat truck chassis—with a powerful winding drum and 1100 yd. of steel cable. As the balloon with observer's basket attached is sent aloft, the engine pays out cable over the winding drum until the required height has been attained, when the car holds the balloon prisoner, but is ready at any moment to haul it down if weather conditions, an enemy attack, or accident, render that necessary. The winding drum is mounted with its shaft horizontal, and the cable, which carries a dynamometer, passes through a traveling block to provide for all movements of the balloon due to changes in the wind.

Observer Reports Markmanship

Sometimes by means of the same car, sometimes by another car, the observer in the balloon is connected with the ground. As each shot is fired the observer up aloft reports the effect to the man in the cab, who immediately telephones it to the battery commander close by. One balloon can serve several guns or a series of batteries, hence the messages from aloft go first to the telephone operator in the car, then to the battery commander. Guns and batteries are never far apart, but while the gun is in the most concealed position possible, sometimes in a hole only reached with great difficulty, the balloon must operate from a more or less open space. In the early days horses were used for this work, but now the observation balloon

Fiat telephone car attached to captive balloon

Itala truck carrying anti-aircraft gun

service invariably relies on the gasoline motor.

When daylight fails the observation balloon's crew ceases work. The engine is started, the winding drum put into motion and the big grey gasbag slowly brought down, seized by a group of soldiers and anchored for the night under a special canvas tent hung around with sandbags.

It is then that another motor service comes into action. These are the searchlight cars, which during the day have been hidden away in some wrecked farm or courtyard, or have been buried under a thick covering of tree branches. The commonly employed type on the Western front is a 30-hp. car with a 36-in. projector. The Italians make use of a Fiat chassis almost exclusively; the French employ various makes. Over roads which have been picked out in advance, the searchlight car creeps as close to the trenches as it is possible to go, and trains his searchlight on any position from which an attack is expected or to be feared.

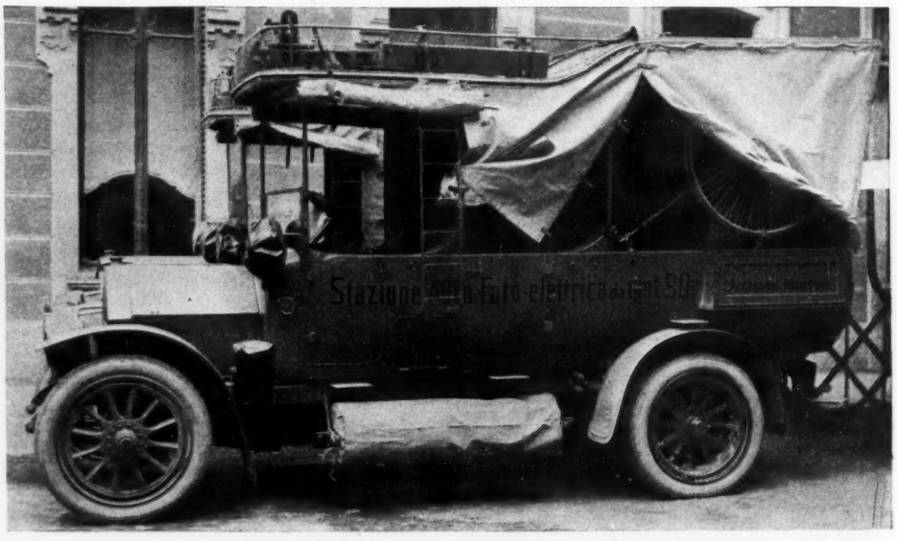
Searchlight Equipment Flexible

With a 36-in. diameter projector it is common to have an apparatus which can be wheeled away on its own bogey to some suitable position two or three hundred yards from the car. This increases the usefulness, for it is often possible to put the searchlight into a position which could only be reached with difficulty or danger by the complete car. After various types have been experimented with the most common plan is to drive the dynamo from the transmission, as, for example, placed in the center of the chassis above the gearbox, with an inclosed chain transmission. Experiments have been made with the searchlight on a separate pneumatic-tired trailer; in another type there are two engines, the one in front for driving the car, and a smaller one in the rear for driving the dynamo only, the searchlight then being in the center. The plan of everything on one chassis and making use of one engine for both the car and the dynamo has proved the most advantageous.

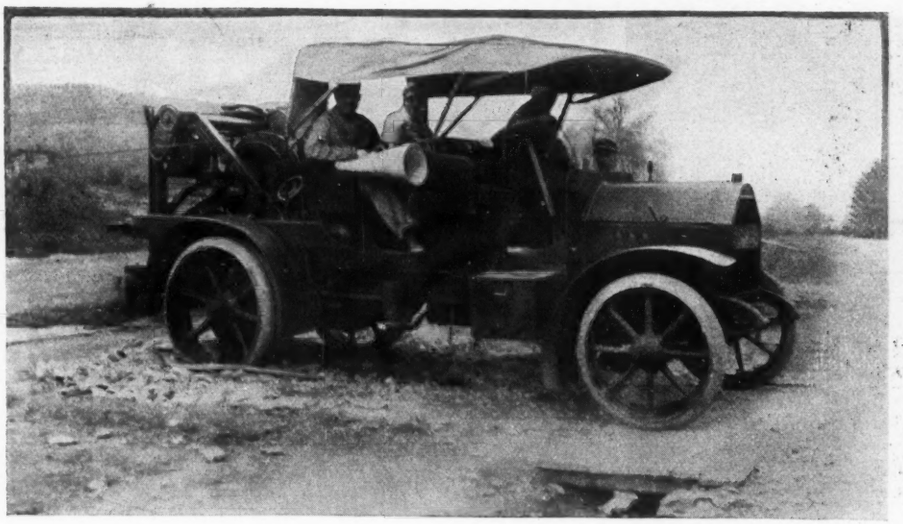
The work carried out by the searchlight car crews is not without danger, as is proved by the perforated condition of all of the vehicles having been at the front for any length of time. As darkness settles down, the cars creep up to their selected positions in absolute silence. If possible, the car is hidden behind some wrecked building or in some hollow of the ground, while the searchlight only is pushed forward to a commanding position from which it can sweep the portion of the enemy's lines in which the officers are interested. The intense blackness is only intermittent, for at intervals a star shell sweeps upwards, bursts into brilliance and reveals every feature of the country as it slowly falls and finally flickers out. Suddenly the white beam of the searchlight sweeps across no man's land to the enemy's lines, fixes itself upon some suspected group of buildings and holds them in its revealing grip. As suddenly all is darkness; then just as suddenly another portion of the line is thrown up in bright relief. If the artillery is not in action absolute silence reigns over the entire district, making it difficult, if not impossible to believe that hundreds of men are moving about just under the level of the ground and that two opposing forces are listening and gazing eagerly for the least movement of the other. The subdued hum of the engine, which in normal times would only excite admiration, under these conditions seems so loud as to be an open invitation to the enemy to open fire. Without any apparent reason a rifle sings out, followed by another and another with such rapidity that in a few seconds the hum of the engine is completely drowned under the rattle of musketry and the monotonous tap-tap-tap of the machine guns. The searchlight sweeps backward and forward across the country in search of the attacking party which may or may not be there. If the attack is a genuine one the searchlight holds the advancing forces in its deadly grip, making them an easy target for the infantry and machine gunners.

Searchlight Cars Close to Enemy

Under the system of trench warfare searchlight cars get nearer to the enemy than any other kind of vehicle. The internal combustion motor, however, is advanced still farther, for on some portions of the front portable gasoline-electric groups are carried into the trenches and the searchlight operated from the front line trench. These are comparatively small outfits, with a face diameter for the searchlight of not more than 10 or 12 in. This work is not exclusively gasoline-electric, many of the armies being equipped with



Italian type motor searchlight equipment



Italian observation balloon car attached to a 12.5 in. gun

acetylene searchlights for this purpose. In many of the Allied front line trenches Evinrude rowboat motors are found driving a pump and keeping the trenches free of water.

Nearly all armies make use of portable gasoline electric outfits for illuminating officers' quarters. These consist of a water-cooled engine with direct coupled dynamo mounted on a wood platform capable of being carried by a couple of men. Wiring, lamp sockets and lamps are packed separately, and are in charge of an electrician. The entire outfit is brought up on a motor truck, and with the aid of three or four men staff quarters can be illuminated completely in about an hour's time. In a war of movement these gasoline-electric units are of considerable value, for they can be brought up as fast as troops can advance and within an hour of the order being given any wrecked building which may have been selected as headquarters can be illuminated in the most modern manner.

Stationary Gas Engines Used

In the constructive work carried out by the engineers only a short distance behind the lines stationary gasoline engines are extensively used.

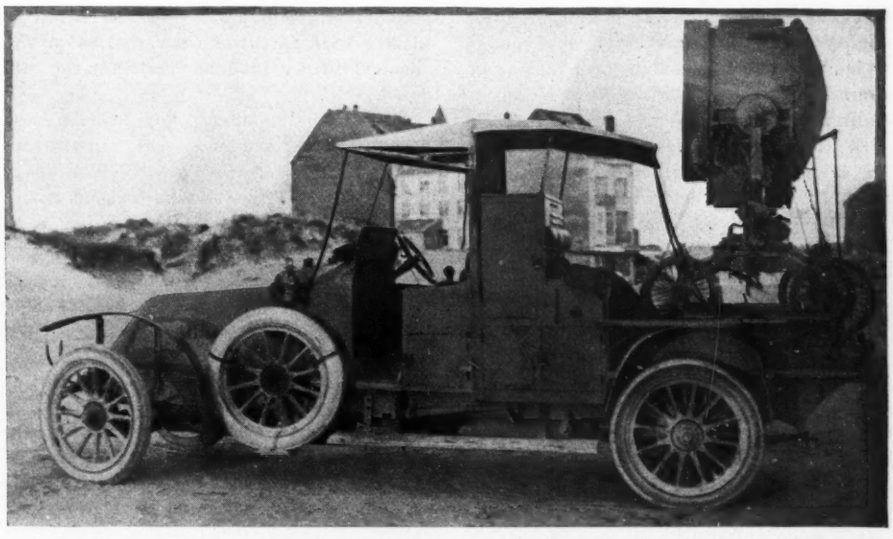
The gasoline engine plays an important role in the postal and telegraph services. Where the rail stops postal vans pick up the mails and carry them with no loss of speed to the troops in the zone of operations and to such an advanced point that they can be distributed by hand to the men in the trenches. Headquarters staffs have wireless outfits attached to them, all motor-hauled.

The special gasoline vehicles which have attracted the greatest amount of popular attention are undoubtedly the huge continuous track drives first designated land dreadnaughts, but always officially referred to as "tanks." Although popular writers have treated these machines as something almost super-human and the public has accepted all the fantastic stories regarding them, they are only the adaptation of a principle which has been exploited for years in the agricultural world. Despite artillery preparation, men were exposed to the gravest danger when they were sent forward to occupy positions which apparently had been rendered untenable to the enemy. When they got out it was frequently to find that the barbed wire had not all been destroyed, and that the machine gunners were quite capable of opening a fire which made all advance practically impossible.

It was obvious that the only vehicle capable of advancing over this broken country, of straddling trenches, of descending into shell holes and of coming out again, of leveling such obstacles as low walls and wrecked buildings was a caterpillar of huge dimensions. The English must be given the credit of having first fully appreciated these conditions and having decided on the construction of heavily armored "tanks." The work was carried out in more than one factory, a traction engine maker producing what in motor car parlance would be termed the chassis, and a car manufacturer being responsible for the Knight engines driving the machines. Except that the powerplant is an American invention, these machines do not owe anything directly to the United States. The statement that a standard type of caterpillar tractor was used is as absurd as it is inaccurate. It is quite probable, however, that the success of American caterpillar tractors in hauling heavy guns over broken country first gave the English engineers the idea of building an armored caterpillar of hitherto undreamed of dimensions.

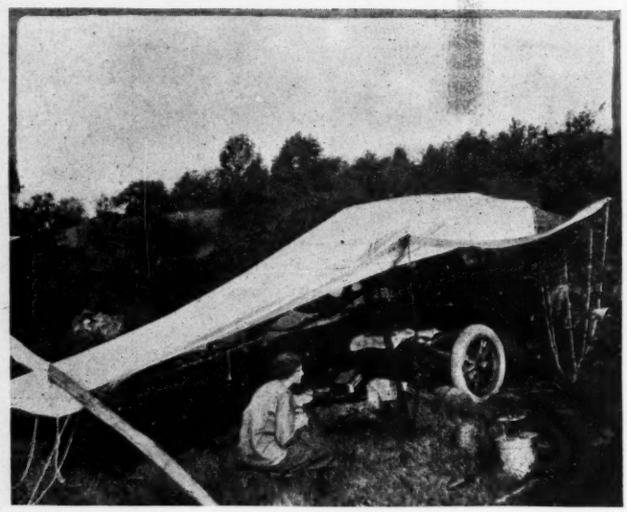
Tanks Fulfill Expectations

There is no doubt that these machines fulfilled all expectations and employed on a big scale might render impossible fixed trench warfare. Reports show that again and again they got astride enemy trenches and opened such a terrible fire that men came out and surrendered in hundreds without the attacking party losing a single man. If, to make tank attacks impossible, the trenches are widened so that these machines cannot bridge them, they lose most of their value as trenches. The only ready way of meeting them would appear to be the construction of concealed holes in front of the trench positions in the hope that the tanks would fall into them and be unable to extricate themselves. As they are at present vulnerable to artillery, the obvious tendency will be, now that the advantage of surprise has passed away, to build bigger and bigger tanks, more and more heavily armed. In this respect the conditions are somewhat similar to those in naval warfare. There is no doubt tanks will play an important part in the future fighting, and there is no reason to suppose that their use will be confined to the Allies. There being nothing fundamentally new in the idea, German engineers are quite capable of designing successful tanks, the only disadvantage they labor under being that of late preparation.



French type of motor searchlight

There is no fun in camping with a car unless you are comfortable. This is a story of comfort in camping



The camp above shows the stove pail in the right foreground, the demijohn in line with the hind wheel, and the mosquito tent hanging from the white shelter tent, which make for comfort

When Women and Car Go Camping

How to Have Comfort

By Charlotte M. Whiting

FOR women at least the pleasure and benefit to be derived from camping or out-of-door life of any kind are increased to an almost infinite degree by little comforts and conveniences. Things which mighty man in his superiority would laugh to scorn as of no importance, in fact as incumbrances, his wife will find to be an unending blessing.

Of the greatest convenience for a roving camp life is a Pullman apron of serviceable color and material. In its many pockets should be all the requisites of the daily toilet. This function has to be performed under various circumstances and under auspices sometimes favorable and sometimes far otherwise. You may be lucky enough to camp near a stream or pond, or your morning ablutions may depend entirely upon your own wash basin and water from your own demijohn. It is an excellent plan to take a plentiful supply of the cheapest grade of cheesecloth. Cut it into small squares for washcloths and larger ones for towels and keep one pocket of your apron always full of them. They can be burned or buried after using, thus doing away with the disagreeable necessity of carrying damp towels about. It is advisable, however, to have a large crash towel in addition, as, in case one should be blessed with facilities for a real swim, the cheesecloth is a bit inadequate for the rub-down.

Experienced campers find it best to dispense with lingerie underwear, substituting for it either perfectly plain crepe or stockinette wear. These can be washed easily and quickly and dried either in camp or in the hotel room, making the burden of many changes unnecessary.

The costume for a motor camping trip requires a bit of thought. It must be serviceable for roughing it and presentable for an arrival at a hotel and an occasional lunch in a restaurant. A Norfolk suit of khaki or dark jersey cloth worn over bloomers or knickers, with a plain blouse of pongee, is as good as anything. The hat problem is settled easily by the endless variety of sensible and pretty sports hats with which we of to-day are blessed. Be sure to take a sweater, even in summer, and a light warm ulster. Happy is she who has an ulster old enough to be a comfort rather than a care, yet still perfectly respectable, long, light-weight, but warm and finished with capacious pockets and a hood! It is needed often even in midsummer for an early morning start or a late evening arrival. In a hotel it serves as a bathrobe, thus reducing the luggage. But it is best of all in that cold hour just before dawn, when one snuggles down into its depths, pulls the hood well over one's head and glories in being out under the stars and warm.

This brings us to most comfortable arrangements for the night. First and foremost let each bed be provided with a mosquito netting tent. Without this one would much better remain at home. These tents should be equipped with a series of strings fastened to their roofs, to be tied to a corresponding series of loops hanging from the under side of the roof of the shelter tent. Or in the case of the incurable sleeper under the open skies, the bed may

Sunrise over Cloud's Summit of Mount Greylock, Mass. —an ulster with a hood makes this a joy and a thing of beauty, instead of a freeze-out

The camp in a field near an apple tree shows flat form of tent possible with balloon silk and small mosquito tent hanging from roof of shelter tent

be arranged under an apple tree and the mosquito tent hung from a low limb.

Folding canvas camp cots make beds of which the most luxury-loving induvidual will not complain—after the first night. Another bed, narrow, but otherwise ideal, may be made by placing the car's cushions end to end on the ground. If one has no sleeping bag, two dark wool blankets sewed together on three sides will prove a satisfactory substitute. Unless the bedding is in bag form it is almost impossible to keep it from slipping onto the ground.

The Sleeping Costume

If the trip be at any time other than summer, a hot-water bottle is acceptable. The water may be heated over the supper fire, for one usually retires immediately after that meal, too sleepy from the long hours of riding in the open to care for anything but bed. A pocket flashlight where one can readily lay hand on it in the night will prove a trusty friend.

The actual sleeping costume is entirely a matter of personal taste. Some cannot forego the luxury of regulation nightclothes, with an ulster or long dark robe within reach. Others prefer to remain more or less fully dressed to be ready for any emergency. One woman who spends weeks every summer in motor camping prepares for the night as follows: She removes all binding clothing, substitutes a middy blouse for her fresh daytime shirtwaist, doffs her skirt, which she rolls tightly and neatly and puts under her pillow, with sneakers tied together beside it, puts on fresh stockings, braids her hair in two neat tails over her shoulder, wriggles or rather squirms into her sleeping bag and sleeps the sleep of the just, secure in the knowledge that whatever happens she is presentable and ready for business. It is very important to keep all clothing under cover in the night, lest it be drenched with dew.

It is little short of a miracle how many uses for safety pins will crop up in unexpected places. To meet this need keep a long string of them, fastened together end to end, pinned inside the skirt or blouse. Of course, a sewing kit, small but well stocked, is essential. Another comfort is a small bag slung from the belt to contain odds and ends which may be needed at times throughout the day, a tube of cold cream, invisible hairpins, penknife, pencil and note book, package of soap leaves, pocket mirror, etc. Speaking of mirrors, the windshield looked at from outside makes a very excellent one.

Now for a few hints on matters in general. If possible provide yourself with two or three large canvas dunnage bags. In one keep all the bedding tightly rolled, the tents in another and rainclothes and extra wraps in a third. It is very important to have system and order in the daily packing of the luggage and to keep everything as compact as possible.

It may be romantic and picturesque to depend on a camp fire for cooking, but it is not practicable. Take instead a blue-flame stove such as is sold by sporting houses. The mention of this stove and the assurance that no camp fires will be built often gains permission to camp in orchards or farmyards, where the natural objection to fires would otherwise cause it to be withheld.

A galvanized iron pail with a tightly fitting cover, such as a small garbage can, will carry the stove and its equipment of matches, alcohol or gasoline used for starting it, etc. Let the etc. include a pair of 10-cent working gloves, and you will be saved blackened fingers and burns.

The Pantry Tin

Large tin flour or sugar cans with hinged lids make ideal pantries, keeping the food free from moisture, dust, spiders and other pests.

One item which you will never regret taking is a cooking apron large enough to cover you from throat to feet, to preserve your clothes from the constant reminder of meals prepared and eaten in the past.

As to drinking water, take with you a demijohn and fill it in the larger towns, where the water supply is known to be good, rather than risk trouble from the often questionable well water of the chance farmhouse.

Packing always is more or less of a problem, and system is needed to facilitate matters in starting

Kerosene Needs Better Manifolds

Results Best if Designed for Uniform Distribution and as Short as Possible

THIS is the conclusion of a paper presented before the Society of Automotive Engineers during the Fremont national tractor demonstrations by W. G. Clarke, chief engineer of the Wilcox Carbureter Co. In his paper Mr. Clarke told the engineers what has been done and what must be done to make tractors operate successfully on low-grade fuel, kerosene in particular, to the end that the work of cooperation and standardization so vitally necessary in the tractor industry be furthered. The section last week took up experiments made in the use of kerosene, the results of which showed heat must be applied to assist in the vaporizing of the fuel, particularly for multiple-cylinder engines, and that the first step in the solution of the tractor problem lies in the determination of the best method of applying this heat. The conclusion of his paper follows:

The type and location of spark plugs is a very important factor in kerosene work, as the spark plug is one of the commonest sources of pre-ignition. A plug with a heavy metal body and heavy wire electrodes presents a large heating surface to the burning charge and often becomes red hot, causing excessive pre-ignition.

The plug should preferably be located in the center of the cylinder head in a well-waterjacketed position, so as to be cooled as much as possible. A spark plug placed in a valve cap, especially over a hot exhaust valve, cannot be cooled and will burn up and cause pre-ignition with kerosene fuel.

Rough Spots Undesirable

Cylinder combustion chambers must be smooth since rough spots or small metal projections soon become glowing points.

There is still much to be done towards perfecting the design of manifolds for low-grade fuels.

In multiple cylinder motors the problem of distribution without condensation of the fuel is just as important and probably more difficult than the production of a vaporized charge. Experiments have shown that kerosene mixture will condense in the manifold at temperatures below 350 deg. Fahr. unless the gas velocity is kept very high. For this reason the best results are obtained by making the manifolds as small as possible without causing a power loss and wire drawing. This is feasible with the tractor motor because it is still essentially a slow-speed motor. We experimented with a manifold composed of a bundle of small copper tubes soldered together having in it a sliding throttle which controlled the number of tubes in operation. By this means we were enabled to maintain a practically constant velocity at all speeds, which meant that by carrying an initially high velocity we could maintain a dry mixture with the minimum of heat.

In some of our earlier kerosene experiments, excessive manifold condensation gave us a great deal of trouble. We found that by placing dams or baffles in the manifold that this trouble could be greatly reduced, as the fuel in breaking over the sharp edges of the baffles was pulverized into very fine particles instead of going through in large globules.

I do not believe that a manifold should pass through the water jacket if kerosene is to be used as a fuel. The temperature of the water jacket is lower than the mixture temperature at light loads, which will cause condensation and loading, although at full load it would not make so much difference.

In general a small manifold designed for uniform distribution and as short as possible will give the best results. It is hardly necessary to dwell on the fact that the fewer turns in the manifolds and pockets in the valves, chambers and cylinders, the better distribution and operation will be obtained.

The present design of opposed motors with their long exposed manifolds offer the greatest difficulties in distribution of heated mixtures. However, these difficulties can probably be largely overcome by exhaust jacketing or insulation or by retarding the intake valve opening to obtain a high vacuum.

There are several designs of double or exhaust jacketed manifolds now in use for multiple cylinder motors which are all more or less subject to criticism. In most of them only the upper wall of the intake manifold is in contact with the exhaust. This construction produces a condition in the mixture which is diametrically opposite to that desired. The lighter and therefore more thoroughly broken up particles of fuel are the ones which impinge directly on the upper hot surface, while the heavier unvaporized globules of fuel follow the lower and less heated wall, especially at low velocities, which does not make for a homogeneous mixture and which is quite likely to produce carbon through cracking.

Another form of the exhaust heated manifold which does not distribute the heat uniformly is of the type that allows the exhaust to escape from one end only. This means that those parts of the intake nearest the exit receive more heat than other parts farther away.

In spite of careful precautions against pre-ignition we invariably encounter it in high temperature work unless the compression is so low that efficiency is greatly decreased. A well designed motor will deliver a little more than three-quarters of its maximum power without pre-ignition, so that it should not be necessary to use water in the mixture much below that point. The primary object in using water is to cool the mixture before it enters the cylinders, so as to keep the volumetric efficiency as high as possible and to stop pre-ignition. In some types of engines the amount of water necessary is quite high, varying from 20 to 50 per cent, but if properly used in a well designed motor from 6 to 12 per cent should be amply sufficient.

Atomizing Water

In order to use as little water as possible it should be introduced in a finely atomized condition so as to present the greatest cooling surface with the least volume. The necessity of using a minimum of water is apparent when you remember that in vaporizing the water extracts its heat from the fuel, so that for every ounce of water it takes about 5 per cent of the same amount of kerosene to vaporize it.

We have never been able to find any evidence that water had any appreciable effect either in the formation or removal of carbon.

Routes and Touring Information

Circle Tour Around Lake Michigan

Milwaukee, Wis.—Editor MOTOR AGE—Outline a tour around Lake Michigan including the upper Peninsula.—A. S. Hathaway.

From Milwaukee drive to Cudahy, South Milwaukee, Racine, Kenosha, Winthrop Harbor, Ill., Zion City, Waukegan, North Chicago, Highland Park, Kenilworth, Evanston, Chicago, South Chicago, East Chicago, Calumet, Gary, Aetna Station, Miller, East Gary, Porter, Michigan City, New Buffalo, Three Oaks, Sawyer, Bridgman, Stevensville, St. Joseph, Benton Harbor, Riverside, Coloma, Watervliet, Covert, South Haven, Douglas, Saugatuck, Graafschap, Holland, West Olive, Grand Haven, Ferrysburg, Muskegon, Whitehall, Montague, Hart, Pentwater, Ludington, Scottville, Manistee, Bear Lake, Benzonia, Beulah, Traverse City, Elk Rapids, Kewadin, Torch Lake, Eastport, Charlevoix, Bayshore, Petoskey, Conway, Pellston, Van Levering, Mackinaw, ferry across the straits of St. Ignace, St. Ignace, Newberry, Dollarville, Germfask, Blaney, Whitedale, Manistique, Jacks Bluff, Esabella, Nahma, St. Jacques, Ensign, Rapid River, Escanaba, Spalding, Menominee, Marinette, Wis., Peshtigo, Oconto, Collardsville, Big Suamico, Green Bay, Denmark, Kellner's Corner, Manitowoc, Erdman's Corners, Sheboygan, Port Washington, Lakefield Corners, Milwaukee.

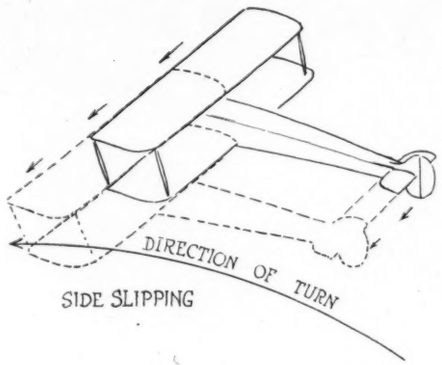
There are very bad stretches of poor macadam from Chicago to Michigan City. Roads a trifle better will be found by going via South Chicago, Hessville, Highland, South Gary, Hobart, and then striking the first mentioned route at Miller. Very bad road conditions also exist around Muskegon and Manistee. It would be best to leave the lake shore at Holland and go eastward from there to Grand Rapids, then to Cadillac to Petoskey. A safe method to follow would be to inquire along the way as to road conditions ahead of you and make such detours as you think necessary.

Vols. 5 and 4 of the Automobile Blue Books, published at 910 South Michigan avenue, contain complete running directions.

EDITOR'S NOTE

MOTOR AGE outlines route itineraries for its readers by letter. Each week only a few of the routes asked for are published, these being those of more general interest. In asking MOTOR AGE for routes, write your name and address distinctly on a return envelope.

A. B. C. of Aviation



Nomenclature for Aeronautics as Approved by the National Advisory Committee for Aeronautics

Leeway—The angular deviation from a course over the earth, due to cross currents of wind.

Lift—The component of the force due to the air pressure of an aerofoil, resolved perpendicular to the flight path in a vertical plane.

Lift bracing—See Stay.

Lifting capacity—See Capacity, lifting.

Load, full—See Capacity, lifting.

Reserve (or useful)—See Capacity, carrying.

Loading—See Wing Loading.

Longitudinal—A fore-and-aft member of the framing of an airplane body, or of the floats, usually continuous across a number of points of support.

Longitudinal stability—See Stability.

Metacenter—The point of intersection of a vertical line through the center of gravity of the fluid displaced by a floating body when it is tipped through a small angle from its position of equilibrium and the inclined line which was vertical through the center of gravity of the body when in equilibrium. There is, in general, a different metacenter for each type of displacement of the floating body.

Monoplane—A form of airplane whose main supporting surface is disposed as a single wing on each side of the body.

Motor—See Engine.

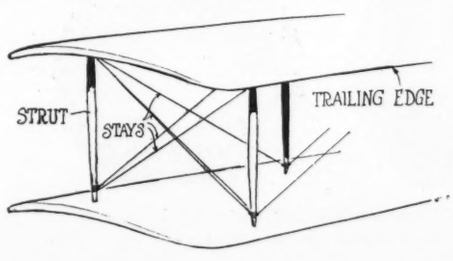
Nacelle—See Body.

Natural stability—See Stability.

Nose dive—A dangerously steep descent, head-on.

Ornithopter—A form of aircraft deriving its support and propelling force from flapping wings.

Pitot tube—A tube with an end open square to the fluid stream, used as a detector of an impact pressure. More usually associated with a concentric tube surrounding it, having perforations normal to the axis for indicating static pressure. The velocity of the fluid can be determined from the difference between the impact pressure and the static pressure. This instrument is often used to determine the velocity of an aircraft through the air.



Propeller:

Developed area of—See Developed area of a propeller.

Disk area of—See Disk area of a propeller.

Right-hand—One in which the helix is right handed.

Pusher—See Airplane.

Pylon—A marker of a course.

Race of a Propeller—The air stream delivered by the propeller.

Rib—See Wing.

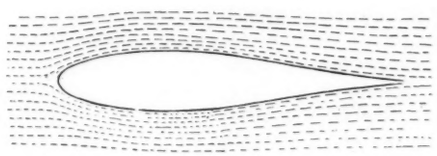
Right or Left Hand

Engine—See Engine.

Propeller—See Propeller, right-hand.

Rigid dirigible—See Dirigible, rigid.

Rudder—A hinged or pivoted surface,



usually more or less flat or stream lined, used to control the attitude of an aircraft about its vertical axis when in motion.

Side slipping—Sliding toward the center of a turn. It is due to excessive amount of bank for the turn being made and is the opposite of skidding.

Skidding—Sliding sideways in flight away from the center of the turn. It usually is caused by insufficient banking in a turn and is the opposite of side-slipping.

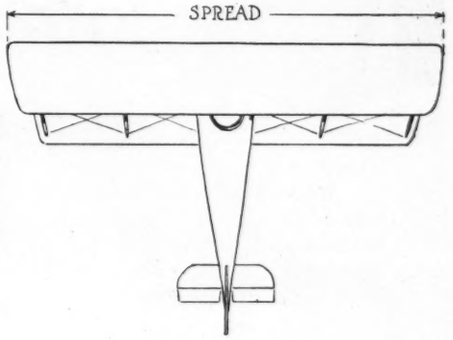
Skids—Long wooden or metal runners designed to prevent nosing of a land machine when landing or to prevent dropping into holes or ditches in rough ground. Generally designed to function should the wheels collapse or fail to act.

Slip—This term applies to propeller action and is the difference between the actual velocity of advance of an aircraft and the speed calculated from the known pitch of the propeller and its number of revolutions.

Soaring machine—See Glider.

Spread—The maximum distance laterally from tip to tip of an airplane wing.

Stability—The quality of an aircraft in flight which causes it to return to a condition of equilibrium when meeting a disturbance. This is sometimes called dynamical stability.



Directional—Stability with reference to the vertical axis.

Inherent—Stability of an aircraft due to the disposition and arrangement of its fixed parts.

Lateral—Stability with reference to the longitudinal or fore and aft axis.

Longitudinal—Stability with reference to the lateral, or athwartship, axis.

Stabilizer—See Fins.

Mechanical—Any automatic device designed to secure stability in flight.

Stagger—The amount of advance of the entering edge of the upper wing of a biplane over that of the lower; it is considered positive when the upper surface is forward.

Stalling—A term describing the condition of an airplane which from any cause has lost the relative speed necessary for steerageway and control.

Statoscope—An instrument to detect the existence of a small rate of ascent or descent, principally used in ballooning.

Stay—A wire, rope or the like, used as a tie piece to hold parts together or to contribute stiffness; for example, the stays of the wing and body trussing.

Step—A break in the form of the bottom of a float.

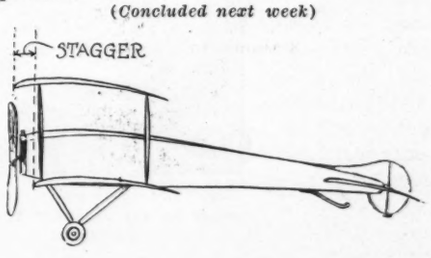
Streamline flow—A term in hydromechanics to describe the condition of continuous flow of a fluid, as distinguished from eddying flow where discontinuity takes place.

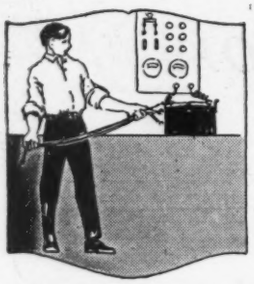
Streamline shape—A shape intended to avoid eddying or discontinuity and to preserve streamline flow, thus keeping resistance to progress at a minimum.

Strut—A compression member of a truss frame; for instance, the vertical members of the wing truss of a biplane.

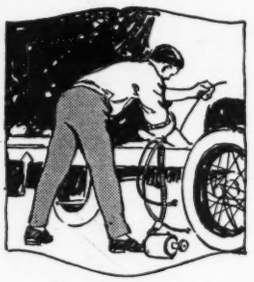
Sweep back—The horizontal angle between the lateral, athwartship, axis of an airplane and the entering edge of the main planes.

(Concluded next week)





Electrical Equipment of the Motor Car



By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the fifty-eighth installment of a weekly series of articles begun in MOTOR AGE *issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York, in a size to fit the pocket conveniently.*

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. Electric motors and engine and motor connections then were considered. Ignition was taken up next.

Part VIII—Impulse Starters and the Ford Magneto

AN impulse starter as made by the Su-mpter Electrical Co. is shown in Fig. 320. It consists of a notched member, A, fastened to the end of the armature shaft, and a driving member, B, which has two small extensions on its outer surface directly opposite each other. These two members are connected by springs as shown in Fig. 321, which also shows method of replacing springs. A small pin extends from the surface of the member B into the opening between the ends of the two springs. The short spring acts as a bumper spring and tends to absorb the shock of the longer spring when the armature of the magneto is driven forward suddenly. A pawl, C, is mounted in such a position that it will engage the notches in the outer surface of the driven member, A, as this member tends to rotate, provided the end of the pawl is turned so that the action of the spring tends to press it down on the outer surface of the member A. Assuming the pawl is engaged in one of the notches in the member A and that the member B is rotating, then the long spring will be compressed. As the member B rotates, one of the extensions will move under the end of the pawl and raise it out of the notch in the member A and allow the member A to rotate momentarily at high speed until it automatically restores the pawl to the operating position when the speed drops below a certain value.

The shape of the end of the pawl and the slots in the surface of the member A is such that the pawl is thrown out with such force when the speed has reached a certain value that it becomes entirely inoperative as shown in the figure. It is then necessary to press the pawl down by hand. This restoring operation, however, is not necessary in all models made by the Sumpter Electrical Co., as some are provided with a centrifugal attachment which is again caught by the pawl and the operation repeated.

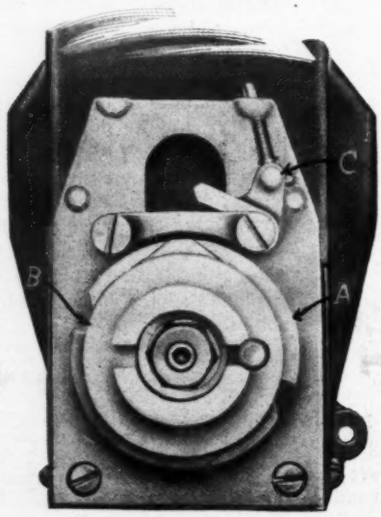


Fig. 320 — Impulse starter made by the Sumpter Electrical Co.

Ford Magneto

The construction of the Ford magneto is radically different from other types, although the fundamental principle upon which it operates is in itself not new. Instead of using two or three horseshoe magnets as in the ordinary magneto the Ford has sixteen permanent magnets arranged in a radial manner with their poles pointing outward and all bolted to one surface of the flywheel as shown in Fig. 322. Mounted directly in front of these magnets and separated by a very small air gap are sixteen coils of copper ribbon. These sixteen coils are mounted on a metal spider which is rigidly attached to the crankcase of the engine, as shown in Fig. 323. The spider and the coils remain stationary, and the magnets are moved past the coils as the flywheel of the engine is

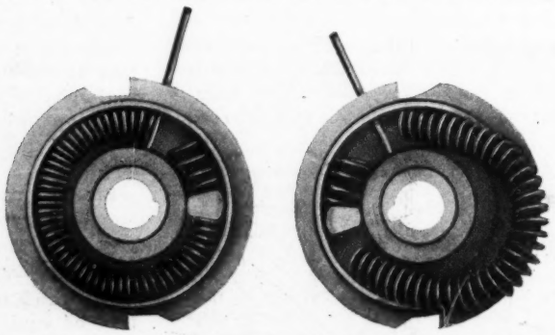


Fig. 321—How the driving and notched members of the Sumpter are connected

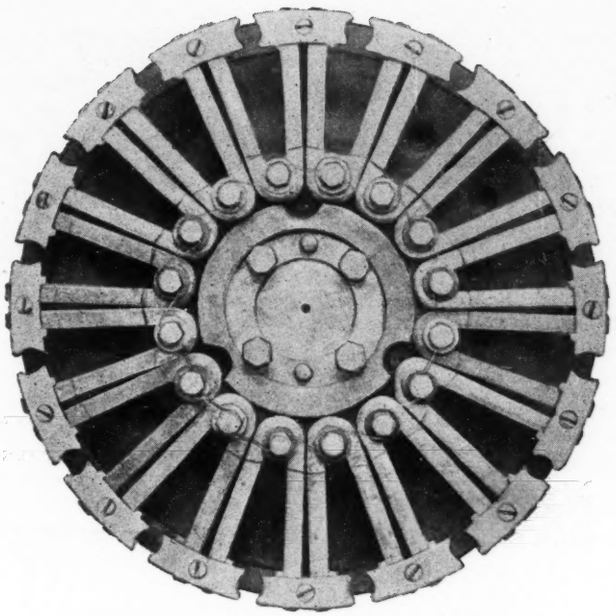


Fig. 322—Permanent magnets of Ford magneto

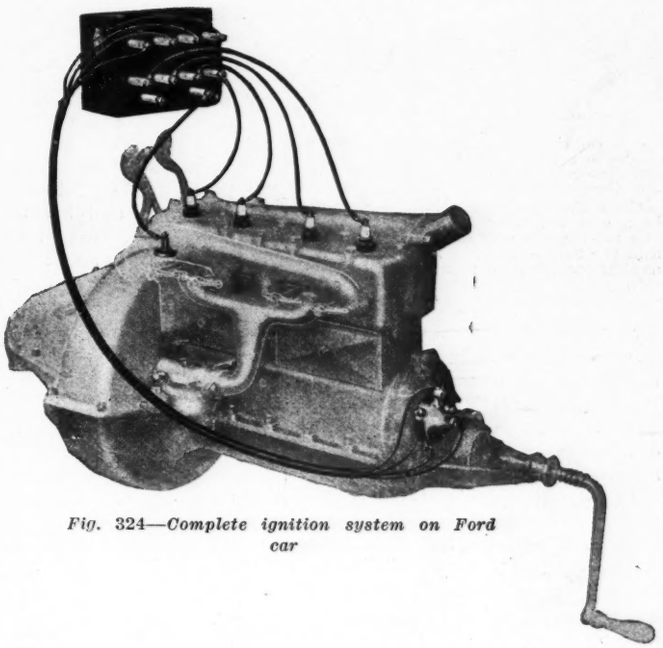


Fig. 324—Complete ignition system on Ford car

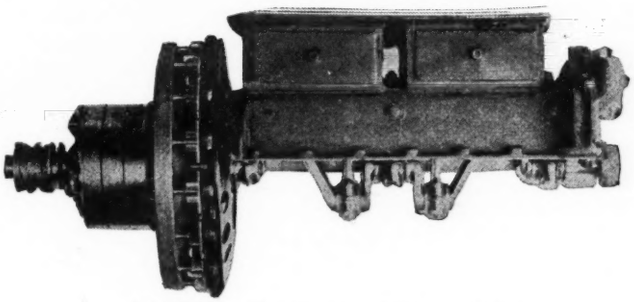


Fig. 323—Ford magneto installed on engine

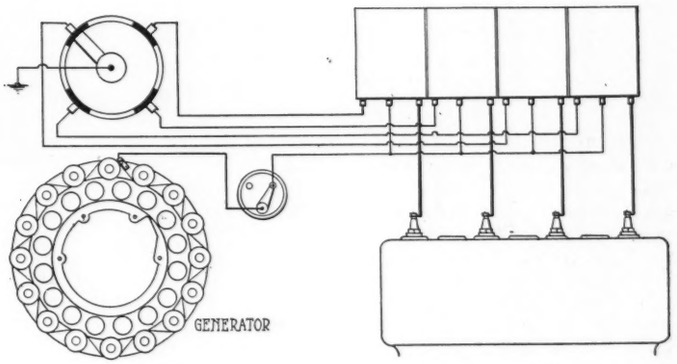


Fig. 325—Wiring diagram of Ford ignition system

rotated, which results in an electrical pressure being induced in the coil windings. These coils all are connected in series and in such a manner that the pressure induced in them is additive so far as the external circuit is concerned. One terminal of the circuit is grounded and the other terminal connected to a metal ring. A brush is mounted in the upper part of the flywheel case and insulated from it, which makes continuous contact with the above mentioned ring. The mounting of this brush is provided with a binding post outside of the flywheel case, which forms one terminal of the magneto winding.

The magneto, with part of its housing removed, is shown in Fig. 324. The four-unit coil is shown in the upper part of the figure. An inspection of the figure will show the following connections: A wire leading from the collector brush on the magneto to one of the lower binding posts on the back of the coil; four primary wires leading from four binding posts on the back of the coil to four binding posts on the low-tension timer, and four high-tension cables leading from four binding posts on the back of the coil to the four spark plugs. The timer is mounted on the forward end of the engine and driven from the camshaft gears.

The wiring diagram of the Ford ignition system is shown in Fig. 325. The switch located in the lead running from the magneto to the coil may be so arranged that a primary, or storage, battery may be used in place of the magneto in supplying current for ignition purposes. The timer is shown directly above the generator and the firing order of the different cylinders may be determined by tracing out the low-tension wires to the different primary windings and the corresponding high-tension wires to the different coils.

The current such a magneto supplies is, of course, an alternating current, and it completes sixteen complete cycles for each revolution of the flywheel of the engine. It may happen that the timer contacts are closed when the electrical pressure in the magneto winding is zero or very low in value, and if such is the case sufficient current will not be produced in the primary winding of the induction coil to cause its armature to vibrate and produce a spark. This results in the spark not being uniformly advanced or retarded as the timer is moved by means of the spark lever, which doubtless accounts for the fact that the engine often will be found to operate much better with the timer advanced but a part of its maximum travel instead of the total amount possible as in the case of the ordinary magneto and battery systems.

Spark Timing

The power output of a gasoline engine depends on the mean effective pressure developed in the engine cylinders. The value of the mean effective pressure is effected by three principal factors: First, the compression to which the gaseous mixture in the cylinders is compressed by the piston on its upward, or compression, stroke just before firing; second, the exact time of the ignition spark in relation to the position of the piston, and third, the length of the stroke of the engine cylinder. It is readily seen that it is the second factor of the above three which concerns the problem of ignition. To obtain the best results, the ignition of the gaseous mixture must take place at the time of maximum compression, which corresponds to the uppermost position of the piston.

Help Corn Save the Wheat

Sour Milk Corn Bread

2 cups cornmeal	1½ teaspoons salt
2 cups sour milk	2 eggs
2 tablespoons butter	1 teaspoon soda
2 tablespoons sugar	1 tablespoon cold water

Cook the meal, milk, salt, butter and sugar in a double boiler for about 10 min. When the mixture is cool add the eggs well beaten and the soda dissolved in the water. Bake in a shallow iron or granite pan for about 30 min.

IN asking American women to conserve wheat wherever possible and suggesting the use of cornmeal as a substitute the Food Administration bases its request on two reasons, namely: We raise two-thirds of all the corn in the world; we already are accustomed to the use of cornmeal.

In amount we raise three or four times as much corn as wheat. Until now we have used perhaps but 5 or 10 per cent for human food. As a grain its food value is approximately that of wheat. In the old methods of grinding it contained more fat and more water. In the newer method, which takes out most of the germ which contains the fat, we still have a product that equals wheat in everything but its power to make a loaf of yeast bread when used alone. Its value as a source of energy is high. Its value as a source of building tissue is equal to that of other cereals.

Cornmeal Ships Poorly

Corn cannot be sent to Europe as easily can wheat. The older methods retain the fat and made it impossible to ship corn long distances. Modern methods make the probability of spoiling less but cannot keep the meal fresh. In addition, corn occupies more space than wheat flour.

The European allies, excepting Italy, probably never have learned to use cornmeal. Is it worth the effort, when our allies already are so hard pressed, to add to their burden this additional burden of revolutionizing their food habits? In France nearly all the breads are made in bakeries outside the home. The baking apparatus and bakers are equipped and trained to use wheat, rye and barley flours; they know nothing of corn. In the United States only about 40 per cent of the bread used is baker's bread. Most of our households are proficient in the art of using all kinds of cereals, especially corn, as muffins, cakes, fritters for breakfast, steamed breads and hot breads for luncheon and fritters, Yorkshire pudding, Indian and fig puddings and spice cakes and so on for dinner.

Cornmeal is an old and familiar food stuff to us; a new and untried food to our allies. To us it is a local product made and ground in the local mills; for our allies, new machinery, new methods and new habits would be necessary.

WOMEN CAN HELP ROADS

The women of the country can help themselves and aid at the same time in the campaign for national efficiency if they will put a little more energy into their work for road improvements. In some parts of the country they are putting this energy into road building and have been for some time. An instance is that given by many localities along the Dixie highway.

In other sections the work is not as energetic as it should be. A woman cannot go out with a road dray and smooth a dirt road after a rain, but if she talks enough about the desirability of doing this she can get it done.

The American Highway Association is among the latest to emphasize the influence of women on road building.

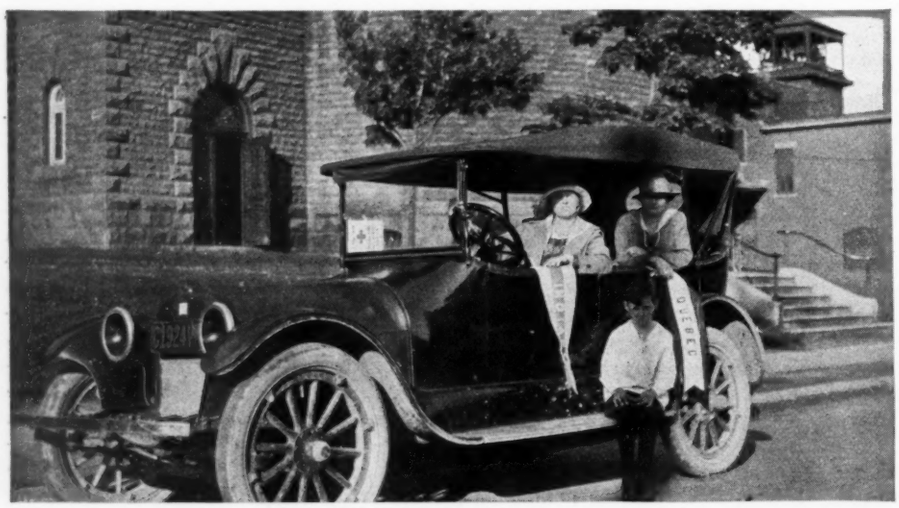
"Of course," says the association, from its Washington office, "the American Highway Association does not suggest the thought that constant nagging is a desirable thing for any cause, but its knowledge of what women have accomplished in many parts of the country by concerted effort convinces this organization that real results of an important nature frequently have waited for the impetus of women's voice to produce action."

Now is the time to urge fewer ruts and fewer insecure bridges rather than more trees and more beautiful shrubs along the highways. It is a time for utility.

MOTOR AGE HELPED THEM

Montreal, P. Q., Canada—Editor MOTOR AGE—Am enclosing a postcard picture to show you what we two women and our little Mascot, Master Dick Weidig, were able to do with your help and a Buick Six. We followed the route you gave us and found the roads splendid, except where we had to detour on account of road construction. We drove from Peru, Ind., to St. Anne De Beaupre, P. Q., stopping at Welland, Ontario and Rochester, N. Y., making side trips to Watkins Glen, N. Y., and other points around both these places, driving in all about 1851 miles and using about 95 gal. of gasoline. We had no trouble at all, not even a puncture, in all this distance, which we think very remarkable. Mrs. Kasier and I did all the driving and were alone except for our Mascot.

I thank you again for your help which meant so much to us in making this drive.—Mrs. Martella Weidig.



Mrs. Weidig, Mrs. Kasier and Dick Weidig, whom Motor Age helped motor from Peru, Ind., through New York, 1851 miles in all

Cornmeal and Wheat Waffles

1½ cups water	3 tablespoons sugar
1 cup white cornmeal	1½ teaspoons salt
1½ cups milk	yolks of 2 eggs
3 cups wheat flour	whites of 2 eggs
1¼ tablespoons baking powder	2 tablespoons melted butter

Cook the meal in the water 20 min.; add milk, the dry ingredients mixed and sifted, the yolks of the eggs well beaten, the butter and the whites of the eggs beaten stiff.

HAVE YOU A PRIVATE GARAGE?

RUSKIN said: "Tell me what you eat and I will tell you what you are." Perhaps had Ruskin lived in the days of motor cars, he might have said: "Show me your garage and I will tell you how you keep your car." Many motorists take great pride in the appearance of their machines and some are as choice of the home in which they house it as the owner of a blooded horse is of his stables.

Are you one of those who have built a garage that is just a little different from your neighbor's; in other words, has your garage the marks of individuality?

MOTOR AGE would like to present to those of its readers who have not given the housing of their cars much thought, the thought of others of its readers who have built for themselves modern up-to-the-minute garages.

Two dollars will be paid for each photograph published, but with each photograph must come a detailed bill of materials and a rough sketch of the floor plan with measurements.

If you have in mind building a garage and will send us an idea as to size and material of which you wish to build, we will plan the building for you and estimate the required amount of material from which you can determine the cost by getting your local building material man to quote prices.

The Owner's Garage

ALMOST any car owner is liable to find himself garageless either from buying a home without a garage, from living temporarily in a rented house or other similar reason.

Rather than let a good car stand out in the weather to deteriorate or depend upon a public garage to house it, some owners might prefer to construct some kind of a temporary shelter until such time as a permanent garage could be built.

A model along the lines illustrated here could be constructed for from $12 up, depending on its completeness and the quality of the material used.

If the cheapest possible proposition is desired, cover the framework with a coarse but heavy unbleached muslin, tacking it to the frame with ordinary turned tacks. Wet the top with all the water it will absorb and, while wet, give it a heavy coat of paint. The water keeps the oil and paint on the surface until it dries enough not to soak into the cloth to any great extent. This procedure saves about two-thirds of the paint required by the dry cloth.

If a better and more attractive-looking job is wanted, have an awning maker construct five sections as illustrated in Fig. 3 with grumets or eyelets properly placed so that they match on the adjoining edges, and the sections can be attached to the framework without injuring the canvas. The roof, or perhaps the whole thing, might be made of some snappy strip with a scalloped border at the eaves.

The front or door end should have straps at intervals on each side to button it to the sides when closed. A heavy pole or a piece of ¾ galvanized pipe run in the bottom hem will form a good roller which may be operated by two light cotton ropes attached on the inside, run under the roller through dead eyes or pulleys, B, and to a cleat, C.

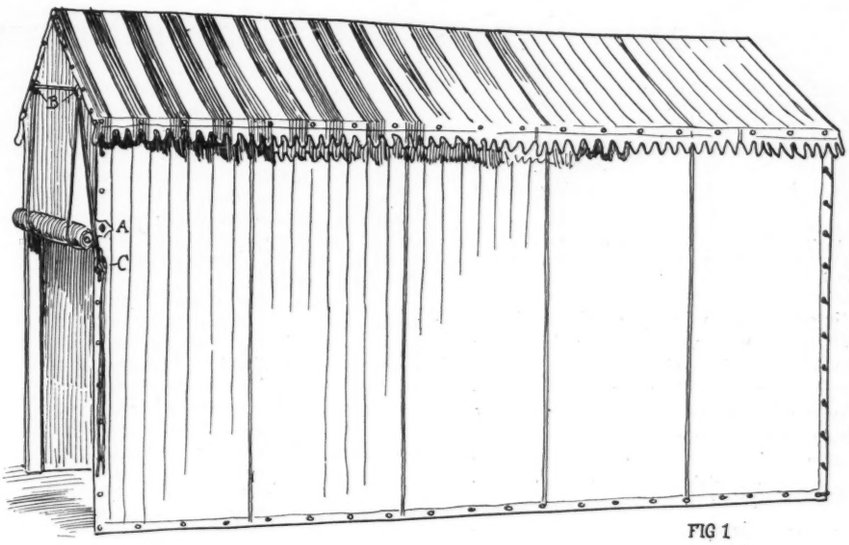


FIG 1

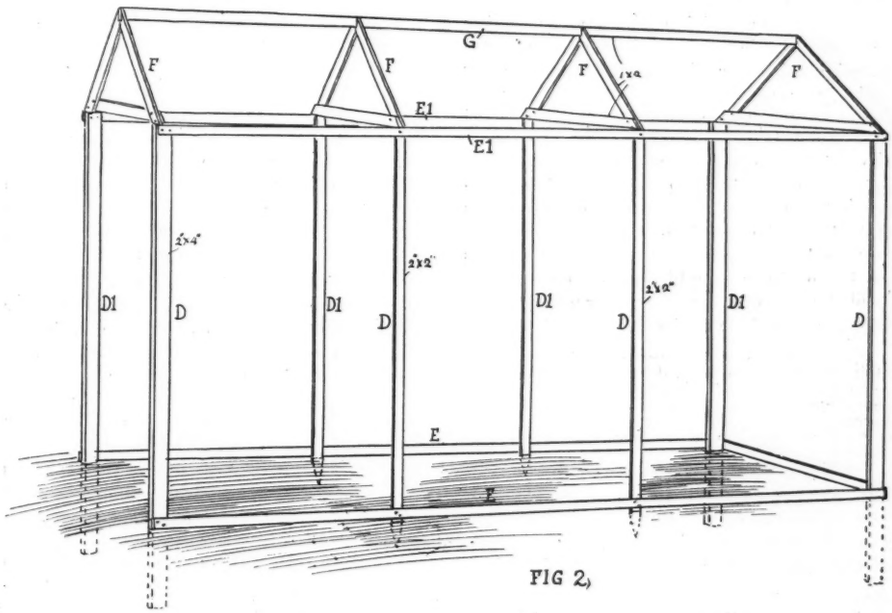


FIG 2

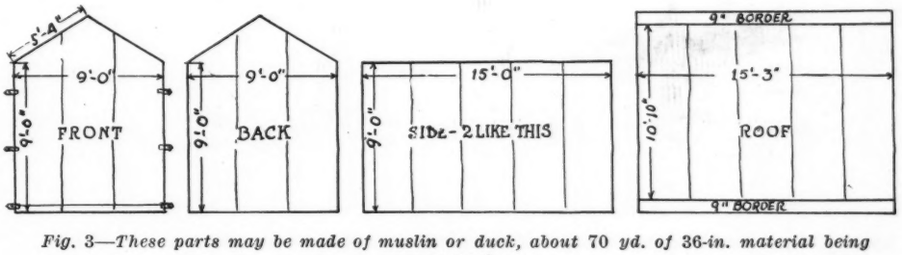


Fig. 3—These parts may be made of muslin or duck, about 70 yd. of 36-in. material being required

Simple Frame Work

The frame work is very simple. Four 2 by 4 in. corner posts—see Fig. 2—are set in the ground about 18 in., and the rest of the frame in the form of 2 by 2 and 1 by 2 strips are nailed to these as indicated in the diagram. Nail all D's and E's together, set up and brace temporarily. Make the four triangles F on the ground and then nail in position. Be sure to get the ridgepole, G, in position straight, as it is the backbone of the whole affair. Do not fill in around the corner posts until your frame is about complete and trued up properly, plumb and square. If the strips E are made of 4 or 6-in. boards the canvas will be farther from the ground and less liable to rot.

The dimensions given for the sections can be used for the framework or they may be changed as requirements demand. Do not fail to erect the garage in a well drained spot—one that is high and dry. A platform could be built, but that is an additional expense and invades the permanent garage territory.

One advantage in making the sectional canvas job is that it can be taken down and sold to some other unfortunate after it is of no further use to its first owner.

THE GARAGE BOOK

The Permanent Buildings Society, Des Moines, Iowa, has prepared for publication a series of garage plans incorporated into The Garage Book. The plans include floor plan, elevation design, information as to the quantity of material required and other practical knowledge important to the garage builder.

A dozen plans are given, ranging from those for a small car to those for two cars and chauffeur's quarters. In addition construction details of tile use are included.

The Readers' Clearing House

Valve Timing and Other Engine Questions

Q.—STATE the valve timing for the 1913 Case 40 motor. Are there timing marks on the flywheel?—Paul A. Hof. St. Louis, Mo.

The flywheel has marks on it for timing the valve. The time of opening and closing the valves is shown in the diagram in Fig. 1.

Q.—Editor MOTOR AGE—What is the correct way to time the valves and ignition on a model R 11, four-cylinder, 1913 Velie?—D. C. Buell, Leon, Iowa.

A diagram for timing the valves of this car is shown in Fig. 3. Inasmuch as the camshaft is chain driven, there are no marks to go by in setting the shaft, excepting the marks on the flywheel. With No. 1 cylinder approaching the dead center and with the pointer on the mark Intake Opens, set the camshaft so that the valve is just at the point of leaving its seat. The camshaft revolves in the same direction as the engine.

To time the ignition revolve the engine so that cylinder No. 1 will be under compression with the piston at the top center and the spark set at full retard. If the car has a magneto, the contact breaker should be revolved in its normal direction until the points are just about to open. At this point the distributing segment should be on cylinder No. 1. If now the magneto is locked to the driving mechanism it will be timed correctly. If a battery system is used the timer should be in such a position that the roller is on segment No. 1, with the spark lever in full retard.

Q.—What are the advantages, if any, of the high speed engine beyond that it eliminates a certain amount of vibration and makes for smoother running? What are the disadvantages?

2—What are the advantages in the valve-in-head motor?

3—What is meant by an "inherently balanced crankshaft"?

4—Is the Hudson Super Six crankshaft really counterbalanced?—J. W. Ratley, Ardmore, Okla.

1—Among some of the other advantages of the high speed engine is that of flexibility of control, which means that the car can get away fast from a standstill and attain its speed without much gear shifting. This is due to the multiplicity of cylinders generally used with engines of this type. The more cylinders there are, the greater the lapping of the power strokes will be and hence the increased flexibility.

Some of the disadvantages of the high speed engine may be stated as greater wear on the bearing surfaces and the difficulty sometimes encountered of getting proper distribution of the gases to the cylinders. It is a question whether or not the added wear and tear on these engines is offset by the steadier and smoother running. Also, the fact that the engine is spoken of as a high speed engine, does not necessarily mean that it is always turning over at great speeds.

2—When the valves are placed in the head of the cylinder, they offer a more direct path for the incoming as well as the outgoing charge. Also theoretically the valve in the head engine will give more power because the combustion chamber approaches more nearly the ideal spherical shape.

3—By an inherently balanced crankshaft is meant one that is balanced by the nature of its construction. In this type of crankshaft the balance weights are a permanent part of the shaft.

4—The Hudson crankshaft is not really counterbalanced in the sense in which the term is generally understood by the layman. The thing that has been done is to balance in a new way the forces present in the engine. This principle is what the company has secured a patent upon. The Hudson crankshaft is not balanced by having weight of equal size, shape and mass at each point of balancing. The shaft is a four-bearing type and at each side of each main and crank bearing there is a weight of some form. These weights are of a size and shape calculated to balance the inertia forces at the particular point at which each is located, or at any rotative speed of the shaft.

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE this week begins the segregation of inquiries into classes of allied nature. Questions pertaining to cooling will be answered under that head and so on.

This means that if you ask several questions in the same letter and they are on different phases of the motor car, these questions will be answered in different sections of the department. You can determine whether an answer appears by referring to the list of names published each week. If your name appears in the list, turn to the section on engines or whatever part of the car you have asked about. A miscellaneous section will take care of all unclassified questions, so do not overlook it if your name is not in a classified section but is in the list.

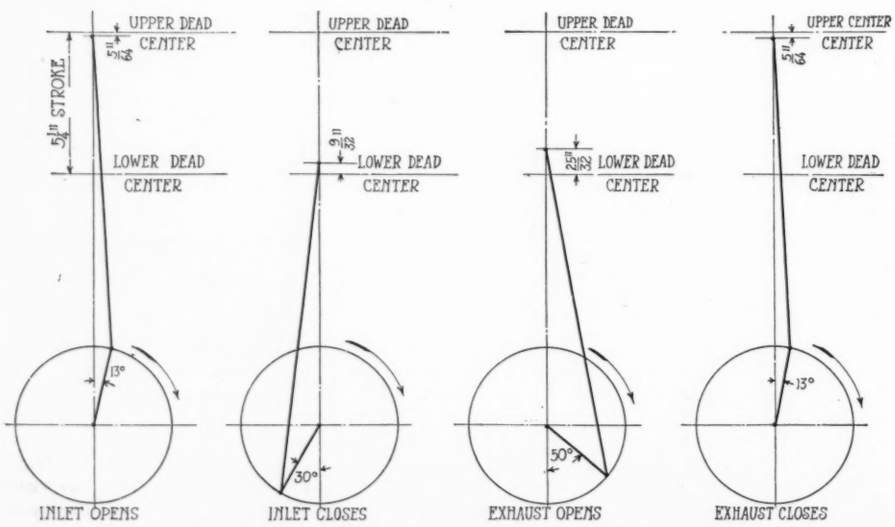


Fig. 1—Time of opening and closing the valves on 1913 Case 40 engine

Q.—What is the proper definition of the term cycle as applied to automobile motors?

1—What are the necessary operations to complete a cycle in a four-cycle or four-stroke cycle gasoline motor?

2—Which of the last two names is correct?—R. S. Johnson, El Paso, Tex.

1-2—The term cycle as applied to motor car engines means simply the four events that take place in the cylinders during every two revolutions of the crankshaft, or four strokes of the piston. The cycle is composed of first, the drawing in of the vaporized gasoline; second, the compression of the latter by the piston; third, the firing of the mixture and finally the expulsion of the burnt charge from the cylinders. The first two operations take place at one revolution of the crankshaft and the other follows during the next revolution. In the two-cycle engine, all this is done during one revolution of the crankshaft, or two strokes of the piston. In other words, the cycle is completed at one revolution of the shaft during which the piston has moved up and down once. Hence the name two cycle.

2—Four-stroke cycle is the correct term to use, but popularly the engines of this type are spoken of as four-cycle. In the same way, a two-cycle engine should be spoken of as a two-stroke cycle engine. In each case the four and two mean the strokes of the piston.

Ignition

Q.—My Overland has been run 11,412 miles. It is equipped with a Remy low-tension magneto. Should the magnets be weak after running this distance?

1—How can the magnets be tested?

2—How many pounds should the magnets be capable of lifting?

3—Is there any danger of overcharging the magnets, and, if so, what would occur?

4—Would the same apply to the Ford magnets?—R. W. Manahan, Powhattan, Kan.

1—It is often a difficult matter to tell just when magnets need recharging as one magneto of a certain make may be able to furnish proper current for a longer time than another instrument of the same make. The quality of the metal from which the magnets are formed has something to do with it also. If everything else on your car seems to be all right and yet you get only a weak spark, you may suspect the magnets to be run down sufficiently to need recharging.

2—One way of testing for weak magnets is to uncouple the instrument from the engine and turn over the armature by hand. When the armature gets to a certain point resistance will be felt due to the breaking of the lines of force. If the magnets are weak little resistance will be felt, because weak magnets produce a weak field. Although not absolutely essential, it is advisable to get another magneto of a similar make which is known to be in good shape and compare the resistance with that of the former. If the spark is weak and sluggish, especially at low engine speeds providing the plugs, cables and connections are all right, suspicion should center around the magnets.

3—Of most of the four and six-cylinder magnetos, the ability of the magnets to lift about 15 lb. a piece shows that they are properly charged. On some of the smaller magnetos, 10 lb. lift would be sufficient. The magnets will lift a greater weight if the latter is applied in small quantities at a time instead of the whole weight at one time.

4—Magnet charging may be carried too far, producing what is commonly called over-saturation of the magnets. When magnets are overcharged, the field is too strong for the windings in the armature.

5—Yes.

Wiring Diagram

Q.—Show wiring diagram of Chalmers model 24 equipped with Chalmer-Entz starting and lighting system.—A. M. Hansen, Trosky, Minn.

This diagram is shown in Fig. 4.

Q.—What is the maximum current output and charging rate of the Westinghouse generator, type B-7, used on the 1913 Case 40?

2—At what speed should the generator start to charge?

3—Give a diagram of the cutout on this generator and discribe its action.

4—Could an ammeter be connected in the lighting system to show charge and discharge? If so, give diagram of connections, stating what size wire is to be used.

5—Will a resistance connected in series with the headlights act as a dimmer?—Paul A. Hof, St. Louis, Mo.

1—The generator should balance an 8 amp. load at 600 r.p.m. and deliver an output of between 8½ to 11½ amp. at 1500 r.p.m. The balance point is defined as that point where the generator carries the entire lamp load without any current in or out of the battery.

2—The generator should start to charge at approximately 350 r.p.m., or between 9 and 10 m.p.h. car speed.

3—A diagram of the cut-out on this generator is shown in Fig. 2. It will be seen that the cut-out consists of a movable arm carrying a contact which completes the circuit through a stationary contact. The movable arm, or lever, is a part of and is controlled by an electromagnet around the core of which there are wound two coils, a series and a shunt; the shunt coil is

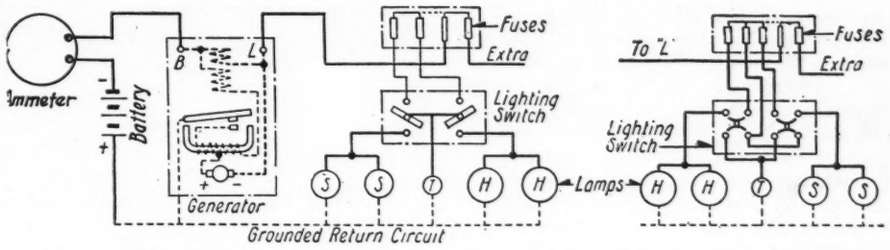


Fig. 2—Wiring diagram of Westinghouse system on Case, showing ammeter connections

in series with the shunt coil of the generator and the series coil is in series with the battery when the cut-out contacts are closed. The operation is as follows: Considering that the generator starts from zero speed and gradually increase in speed, current flows from the armature through the shunt winding of the cut-out, through the main shunt winding of the generator, through the series coil of the generator and back to the armature; this current increases in value as the speed of the generator increases until at a certain predetermined point, the current in the shunt circuit and therefore in the shunt coil of the cut-out is of sufficient value to set up enough magnetism to draw the movable lever down and close the main contacts. As this point is slightly above battery voltage, current starts to flow to the battery from the armature through the series coil of the cut-out, through the cut-out contacts, through battery, in at the B-terminal through the series coil of the generator and back through the armature, the current flowing through the series coil of the cut-out setting up magnetism which is in the same direction as that set up by the shunt coil of the cut-out, thus increasing the pull on the cut-out armature and assisting the shunt coil in keeping the contacts closed. This condition exists for all speeds above cut-in and when the speed of the generator is decreased no effect takes place until the speed of the generator has been reduced to the point where the generator voltage is less than the battery and then the battery starts to discharge through the generator from positive battery through the cut-out contacts, through the series coil of the cut-out, through the armature, through the series coil of the generator, B-terminal, back to the battery. As the current flowing in this direction flows through the series coil of the cut-out in the opposite direction, it sets up a magnetism which opposes that set up by the shunt coil, with the result that when a certain predetermined point is reached, the total magnetism of the circuit is decreased to such a point where the spring on the cut-out lever causes the cut-out contacts to open.

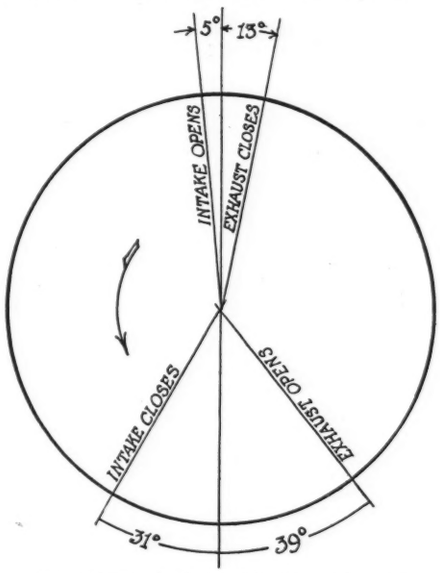


Fig. 3—Diagram for timing valves on 1913 Velie four-cylinder

All other conditions being correct, the time of cutting in and cutting out can be adjusted by changing the spring tension of the movable lever of the cut-out. The normal operation of the cut-out is that when the cut-out closes the current should start to flow to the battery at a rate of between 0 to one and .5 amp. and at the

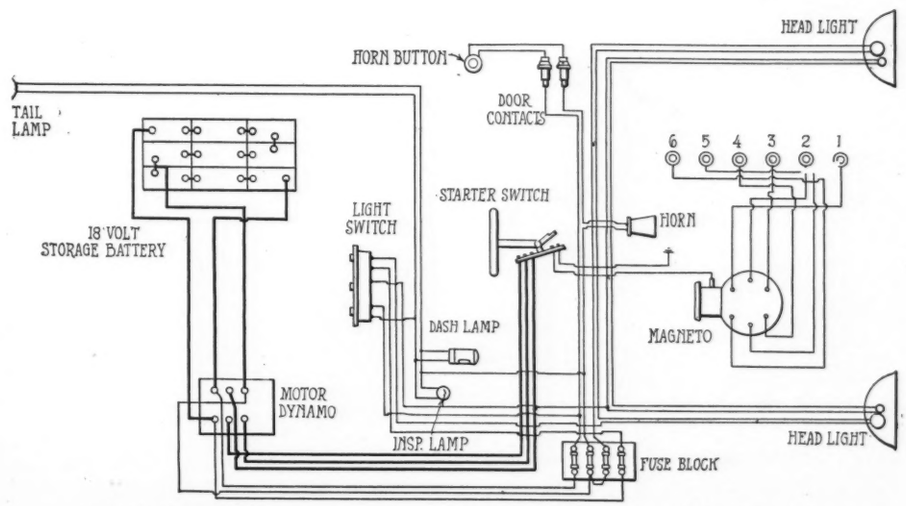


Fig. 4—Wiring diagram of starting and lighting system used on Chalmers 24

cutting-out point the current should be discharging from the battery to the generator at the rate of 0 to 1.5 amp.

4—An ammeter can be connected to this system very readily, as shown in Fig. 2. All that it is necessary to do is to open the line between the negative terminal of the battery and the B-minus terminal of the generator, placing the ammeter in series with this circuit. If any extra line is necessary, wire not less than No. 10 should be used.

5—Yes. This resistance should have a value of approximately $\frac{8}{10}$ to 1 ohm.

Gearsets

Q.—Give directions for adjusting the bevel and pinion gear in the Timken rear axle on a 1913 Case 40.

2—What are the total gear reductions on first, second and reverse?

3—What is the camber and gather of the front wheels?

4—What universals were used on this car and how are the universals at each end of the driveshaft disassembled?

5—In going over a bump with the clutch released there is a tingling noise in the clutch. Is this due to worn discs? Will adjustment eliminate this noise?

6—Give diagram of clutch used on this car.

7—The bearing in the right front wheels acts peculiarly. When turning a corner there is a distinct regular click coming from the bearing which is not heard when a straight course is resumed. The rollers are in perfect shape, although the guides seem to be slightly worn. Could this be the case?

8—How are the roller bearings in the gearset adjusted?—Paul A. Hof, St. Louis, Mo.

1—The adjustment of the pinion and ring gear of this car is shown in Fig. 6. Remove the plate on top of the differential carrier and loosen the clamp bolt. Turn the pinion adjusting nut A until the pinion and gear mesh properly. The ring gear is adjusted sidewise screwing in the nut C on one side of the differential and backing off the other nut C. The pinion shaft bearings are tightened by screwing in the nut B.

2—The total gear reductions on the various speeds are as follows: Direct or high, 2.66 to 1; second, 5.43 to 1; low, 11.2 to 1; reverse, 14.4 to 1.

3—The front axle spindles are set at an angle of 1½ deg. Also the front wheels are set ⅜ in. less at front than at the rear of the wheel.

4—The universal joints on this car were of the Spicer make. They are disassembled by removing the bolts in the flange and screw in the dust housing. This allows the dust and grease housing to be pulled back.

5—Noise in the clutch when going over bumps with the clutch released is generally due to a worn spline which allows the plate to rock. It may also be caused by wear in the clutch backing plate on the pins. If the spline is worn it is advisable to fit a new drive plate.

6—A sectional view of the clutch is shown in Fig. 7.

7—The noise you speak of is probably due to wear in the ball races. In this case you should fit new cups and cones as the bearings will soon go to pieces if used in the present shape very long.

8—The roller bearings in the gearset are adjusted as shown in the sectional view in Fig. 5. It is only necessary to back off on the cap A until the bearing has the proper adjustment.

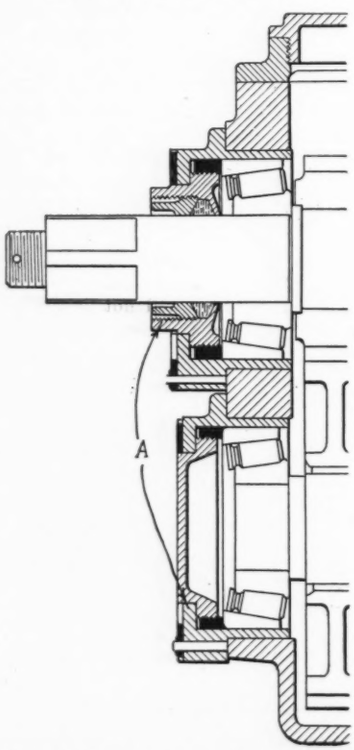


Fig. 5—Adjustment of roller bearings in Case gearset

Communications Received and Inquiries Answered

Paul A. Hof.....St. Louis, Mo.
D. C. Buell.....Leon, Iowa
J. W. Ratley.....Ardmore, Okla.
R. S. Johnson.....El Paso, Tex.
R. W. Marahan.....Powhattan, Kan.
A. M. Hansen.....Trosky, Minn.
Ray Brown.....Anaconda, Mont.
Herbert W. Edwards.Emmettsburg, Iowa
William Robertson.....Askridge, Kan.
Charles A. Richmond...Spokane, Wash.
Billy Younger.....Everett, Wash.
George H. Beatty.....Varna, Ont.
Duane A. Fellows.....Portland, Ore.

Carburetion

Q.—I have a model 490 Chrevolet. On stopping, I find that my carbureter leaks about ten or fifteen drops of gasoline. It seems to come from the connection where the exhaust connects with the carbureter, but I do not think this is loose, as I tried all the bolts around it.—Ray Brown, Anaconda, Mont.

The leaking you mention is probably due to condensation in the inlet manifold, especially if the latter is a long one. This means that the gasoline which otherwise would have been fired in the cylinders collects in the manifold passages and then runs back to the carbureter. It may be that you are using a poor grade of fuel which does not vaporize easily and remains in a more or less liquid state. Then when the engine stops running and the suction of the cylinders ceases, the fuel runs back as before stated and drips from the carbureter.

Cooling

Q.—I find that when I stop I lose a great quantity of water, also often when I turn around. Will you tell me what causes this and what is the remedy for it I thought it might overflow by boiling over, but when I take the cap off the radiator it does not seem to be boiling to any great extent.—Ray Brown, Anaconda, Mont.

There is probably a leak somewhere in the cooling system, such as the hose connections, water connection flange on engine, or in the radiator itself. Sometimes leaks like this can be attributed to leaky connections which hold normally, but owing to vibration when the engine or car is running, allow the water to come out. The latter collects in the sod pan under the engine and when you make a turn, the water is thrown to one side of the pan where there is, perhaps, an opening and it runs to the ground. Naturally when the water boils it is liable to run over into the drain pipe and some of it may be lost in this way. Are you sure that your engine is free from excessive carbon deposit? Running on a retarded spark will cause the water to boil frequently.

Miscellaneous

1—How is the drawbar pull of motor trucks figured?

2—Is there any difference in trucks of like carrying capacity of the different drives, such as internal gear, worm gear, chain drive, etc.?—Herbert W. Edwards, Emmettsburg, Iowa.

1—Drawbar pull is figured by taking the engine torque in pounds at 1 ft. radius, multiplying by the total gear reduction and dividing by the radius of the rear wheel in feet. Thus supposing the torque of the engine at 1000 r.p.m. was 150 lbs., the total gear reduction 8 to 1 and the rear wheel 36 in. in diameter. The drawbar pull at this speed would be $\frac{150 \times 8}{1.5}$ or 800 lbs. In this calculation no allowance is made for losses in the transmission.

2—The power lost in the different forms of drive varies and the workmanship entering into the job has much to do with it also.

Speed Records of Stutz

1—What records does the Stutz now hold?

2—Where is Gil Anderson and why is he not in the races this year?

3—What is the fastest speed a Stutz ever attained?

4—What is the official speed of the Hudson and Stutz stock cars?—William Robertson, Askridge, Kans.

1—According to the chart issued by the

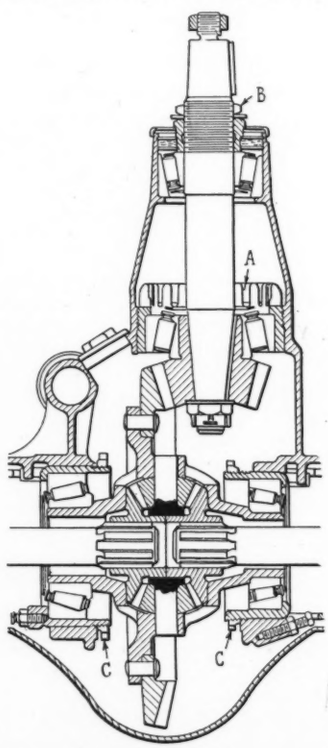


Fig. 6—Adjustment of pinion and ring gear on Case 40

American Automobile Association showing the competitive records of stock and non-stock cars, the Stutz car holds the non-stock speedway record for 350 and 300 miles, made by Anderson at Sheepshead Bay, N. Y., Oct. 9, 1915. The time for the 300 miles was 2:55:32:23 and the other 3:24:42:99.

2—Anderson is at the present time in Milwaukee, Wis. He quit the racing game after injuries sustained in the race at Cincinnati last year.

3—The fastest time made by a Stutz in competition was that of Earl Cooper in the Chicago race last June, when he drove the 250 miles in 2:25:28:8, an average of 103.15 m.p.h. That the cars are capable of more speed than this was shown by some of the practice laps, both this year and last, but definite information is lacking regarding the utmost speed ever gotten out of these cars.

4—There are no official speed records of the stock cars, but they will both do 60 m.p.h. or better.

Safety Device on Drive Shaft

We often hear of a car tearing out the rear end because sudden application of power is more than the rear axle can stand. Would it be practical to place a safety plug or some device ahead of the differential that would work the same as a fuse plug does on an electric circuit—that is, a plug that will carry the full load but would give away on an overload? The plug could be made so that it will shear or twist on a sudden application of excessive power that would wreck the rear axle. The shearing or twisting strength of the plug could be just under the maximum strength of the rear axle. Do you think such a plug or device could be put into use?—Charles A. Richmond, Spokane, Wash.

The idea sounds feasible and it probably would work out all right, providing that certain mechanical difficulties which might come up, could be successfully overcome.

Entrance Into S. A. E.

Q.—How is entrance into the S. A. E. effected? By application?

2—Is dePalma's Packard considered the fastest car in America?

3—Has an official speed test been made of the Hudson Super Six stock model? What is its speed?

4—What is the address of the Fergus car?—J. W. Ratley, Ardmore, Okla.

1—Yes.

2—In competition, yes. The Packard driven by Rader at Sheepshead Bay, N. Y., recently broke several world's speed records and at one time traveled at the rate of 130.4 m.p.h. Whether or not de Palma's car is able to show this speed MOTOR AGE is unable to state.

3—A stock Hudson Super Six was driven by Ralph Mulford at Sheepshead Bay, N. Y., for 24 hr., covering a total distance of 1,819 miles on May 1-2, 1916. This constituted a record at the time, but it has been broken since by a Chalmers driven on the same track by Joe Dawson.

4—This car was introduced last year by the Fergus Motor Co. of America, East Chester, N. Y. MOTOR AGE has had no recent information from this concern and cannot tell, therefore, whether or not this is the correct address at the present time.

Wants Parts for Small Car

Q.—Am building small racing car, equipped with Henderson motorcycle motor. Where can I buy wire wheels to fit 20 by 4-in. airplane tires?

2—Will such wheels fit Ford axles?

3—Inform me of some company who handle parts for small cars.—Billy Younger, Everett, Wash.

1—MOTOR AGE suggests that you write to the National Wire Wheel Works Geneva, N. Y., which concern may be in position to furnish you with these.

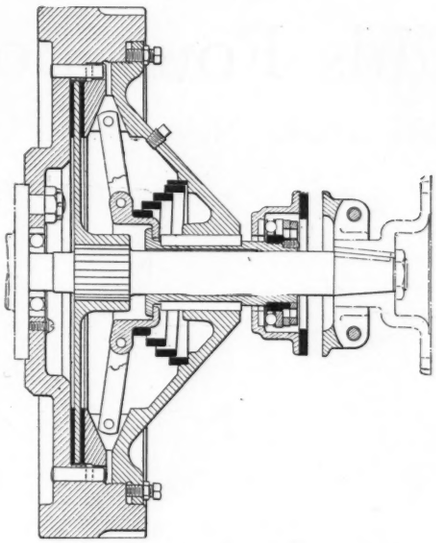


Fig. 7—Cross-section of clutch on Case 40

2—These wheels would not fit Ford axles, unless special spindles were fitted on the steering knuckles of the front axle and some sort of arrangement made to provide a proper hub installation on the rear axle. At best, it would require a great deal of fitting we should think.

3—Write to the Tribune Engineering Co., Owego, N. Y. This company makes a specialty of supplying such parts as engines, axles, wheels, transmissions, etc., for small cars and cyclecars.

Load Capacity of Tire

Q.—What weight will a 28 by 3-in. tire carry?

2—How many cars use the Delco starting and lighting system, and how many the Westinghouse starting and lighting system?—George H. Beatty, Varna, Ont., Canada.

1—The average make of tire of these dimensions when inflated to a pressure of 65 lb. can safely withstand a load of about 400 lb.

2—Of those cars exhibited at the motor car shows this year, twenty-eight makers fitted their cars with the Westinghouse system and seventeen used the Delco. This does not necessarily indicate the exact number of cars so equipped, inasmuch as some makers who might be using either of these systems did not exhibit at the shows.

Gear Ratio and Tires

Q.—I have an Oakland 32-B six-cylinder, with a gear ratio of 4¼ to 1, with 32-3½ tires. What is my gear ratio if I change to 34-4½ tires?—Duane A. Fellows, Portland, Ore.

The gear ratio will remain the same, but by fitting the larger tires you will increase the circumference of the wheels and hence travel further for a given number of revolutions than you would with the smaller size providing the engine can take care of it. When speaking of gear ratio, only the ratio of the drive shaft pinion to the ring gear of the rear axle is taken into consideration. Thus if the pinion had 13 teeth and the ring gear 39, the car would be spoken of as having a gear ratio of 3 to 1. Increasing the tire size will make it a little harder perhaps to negotiate hills.

Bearing Term Defined

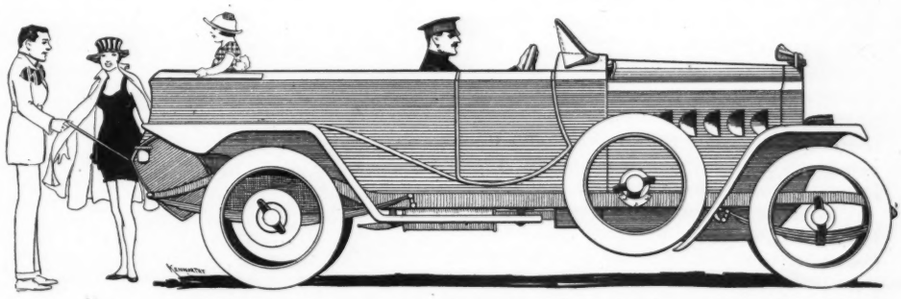
Q.—I have often seen the term annular ball bearing used, but do not know just what they are. Can MOTOR AGE make the term clear to me?—C. N. R., Cleveland, Ohio.

You of course know how the sun moves around the earth annually. The same thing is true of the annular ball bearings, and in this case the steel balls move around the inner member of the bearing called the race. This type of bearing is not capable of taking a thrust; but merely carries the load. The common cup and cone bearings are adjustable and capable of taking a thrust as well as a radial load.

Three-Point Suspension

Q.—What are the advantages of the three-point suspension and do many car makers use it in installing the engines of their cars?—Roscoe H. Kimball, Stanton, Nebr.

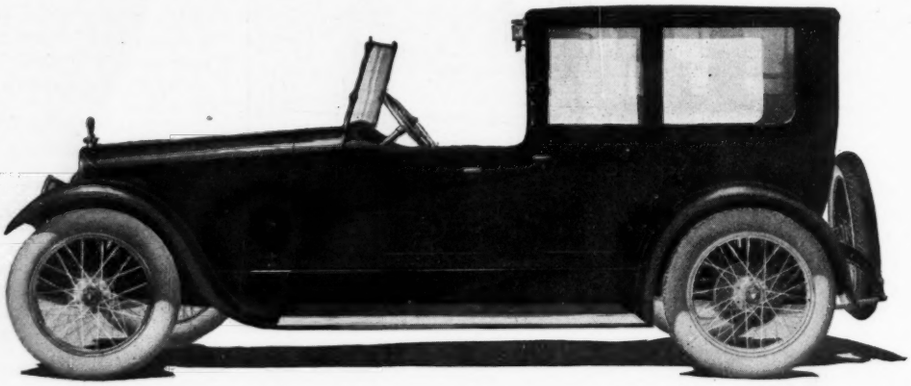
Three point suspension is used a great deal in installing the power plants of the modern motor cars. An engine that is mounted at three points on the frame is subjected to hardly any strains when the frame of the car is flexed, as when going over a bump. Three-point suspension also permits of greater flexibility throughout the chassis without loss of strength, thereby saving weight inasmuch as it requires greater strength to support a load rigidly than flexibly. The way in which the Ford engine is suspended offers a good example of the three-point suspension. If you should have access to a Ford chassis, climb up on the frame and jump around on it, first on one side member and then on the other. You will then, by watching the movement of the power plant, observe how the twisting and warping of the frame does not affect the mounting of the engine. In other words, the engine will adjust itself to whatever position the frame might take. Another way to test out the three-point suspension method is to get a common three-legged stool and one with four legs. Select an uneven spot and place the four-legged stool on it. The chances are that one or more of the legs will not rest on the surface. Now try the three-legged stool and you will find that no matter how you attempt to shift it about, it will always rest on the three legs.



Original body design with sporting lines, as suggested by Kenworthy, one of Motor Age's Artists

Jordan Adds Four Body Types

Individuality Marks New Closed Car Models



The six-passenger Jordan town car resembles the sport limousine somewhat

FOUR new closed type of bodies, the sport limousine, sedan, town car and brougham have been added to the standard line of Jordan cars, which altogether now comprises seven body styles. All seven bodies use the same chassis and it is interesting to know that the latter is identical with the chassis used for last season's Jordan cars. Individuality of body and color which tends to give the impression that each car is a custom rather than a stock product, is one of the notable features of these cars, which are made by the Jordan Motor Car Co., Cleveland, Ohio. The four new models were shown for the first time at the dealers' conference at the factory Aug. 24 and 25.

Prices of Models

The prices of the entire line of Jordan cars is as follows: Sport limousine, in maroon, tan, gray, bronze and yellow, $3,300; four-passenger brougham, blue, green or tan, $2,900; seven-passenger sedan, maroon, green or blue, $2,650; town car, gray, maroon, green, blue or tan, $3,100; roadster, in red, green or blue, $1,795; sport car, gray, blue, green and tan, $1,895; seven-passenger touring, maroon, gray, green or blue, $1,795.

A special custom-made body fitted to the standard Jordan chassis and appropriately named the Jordan Sport Marine, finished in a beautiful shade of Copenhagen blue, was shown to the distributors. In a drawing contest for this, Charles E. Baker, of Detroit, held the ace of hearts. Only one of these jobs will be provided for each distributor. They will not be available to individual purchasers.

The seven-passenger sport limousine, which comes with wood wheels, and $100 more for wire wheels, is a car which would ordinarily be taken for an individual product from one of the custom shops of the larger cities. It has an all-aluminum body and is, in consequence, light. It is also low hung and has four doors. The limousine partition between the driver's compartment and the rear seats can be lowered so that the man who drives his own car can converse with his friends. If a chauffeur is employed, the compartment can be raised by turning a small crank and conversation with the driver can be had without raising the voice by simply touching the button that connects the dictaphone.

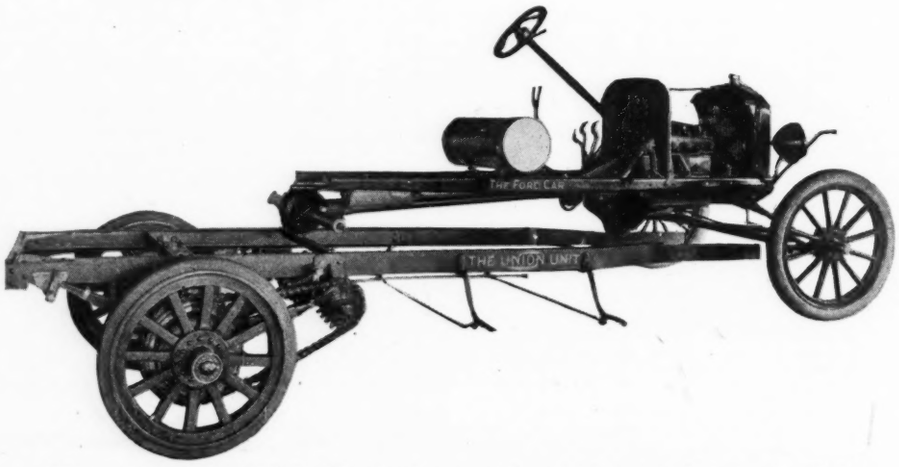
This body, as well as the other Jordan closed cars, is characterized by straight lines and by the latest type of flat roof. The front compartment is upholstered in Spanish leather and the rear in a wide range of optional materials. The rear seat is 46-in. wide and in both front and rear Marshall springs are used. In equipment the car is notably complete with silver finished ladies' toilet case, men's cigarette cases, match box and ash tray, dome lights of special design, step lights, reading lamps, silk roller curtains, clock, coat hooks, hassocks and hat and parcel rack.

The brougham is a four-passenger closed car which takes the place of the coupe, although similar to it in some respects. The seating arrangement is the same as that in a sedan except that the rear seat is brought closer to the front, giving the popular compact seating, although allowing plenty of knee room. This body is also of aluminum, and, like the limousine, is a product of the Walker-Wells shops in Amesbury, Mass. One of the characteristics of this car is the broad window space which allows of uninterrupted vision in any direction.

For city and suburban use, the Jordan town car possesses many of the characteristics of the sport limousine, except that the driver's compartment is more distinctly separated than in the limousine. There is also a difference in the rear compartment, in that the extra seats face the rear instead of the front.

Having a seven-passenger seating capacity and straight line body with staggered doors 27 in. wide, the sedan is representative of the latest in that field of development. It is first a closed car and afterwards a convertible; reversing the order in which these bodies were first constructed. The front end is inclosed by a three-part windshield, with upper and lower sections ventilating. The front and center windows lower completely into the body while the rear can be removed entirely if desired.

The four-passenger sport model has a solid aluminum body, paneled in Honduras mahogany. It is fitted with a raked Troy windshield, carried on cast aluminum supports. The fenders, fillers, frames and chassis are painted in the same color as the body and two options are given, these



The separated units of the Motohaul tractor demonstrate just how much of the Ford chassis is used

being either permanent maroon or Italian tan. It is furnished with a velvet tonneau rug and leather upholstery to match the color of the body. It has a Lin rubber running board and 32 by 4-in. wheels with 33 by 4½-in. tires and a special gear ratio to match. As tire equipment, Silvertown or any other cord tire will be furnished.

The units comprising the Jordan chassis are the Continental engine, Timken axles, Gemmer steering gear, Stewart-Warner vacuum feed, Bosch magneto, Stromberg carbureter, Fedders radiator, Parish frame, Bijur lighting and starting, Willard battery and Firestone tires. Neverleek is used for material in making the tops.

UNION MOTOHAUL TRACTOR

The Union Truck Mfg. Co., 250 West Fifty-fourth street, New York, is manufacturing a unit for converting the Ford car into a Motohaul Tractor. The illustration shows the units separated from the Ford chassis to give an idea of just how much of the latter is used. It will be noted that the rear wheels of the Ford car have been taken off, leaving only the differential housing and rear axle shafts. When attached to the car, the complete outfit has a capacity to haul 3 tons in addition to an allowance of 700 lbs. for the after wagon. The Motohaul Tractor has a normal speed of 10 m.p.h. Its gear ratio is 11.5 to 1.

Turns at Sharp Angle

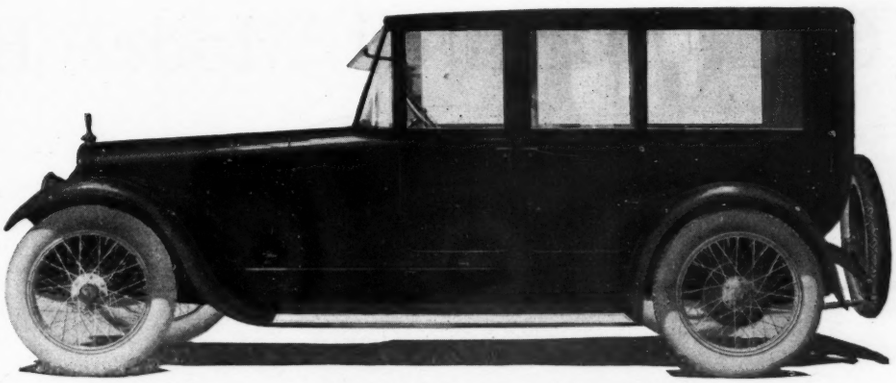
The complete vehicle can be turned around at a sharp angle and in this respect is not unlike a team of horses. An especially short drive shaft is fitted, which replaces the drive shaft of the Ford car and this makes possible a short wheelbase of 110 in. This short wheelbase permits the tractor to turn in its own length, thus making it especially useful around brick and sand piles and in irregular shaped passages where a long wheelbase truck would have difficulty in moving. The Motohaul unit as shown sells for $375. At an additional cost of $45 the company furnishes the after wagon with a lifting jack arrangement which makes it possible to lift up the after wagon and leave it supported on the ground while the tractor is run from under it.

KISSELKAR WINS TWO CUPS

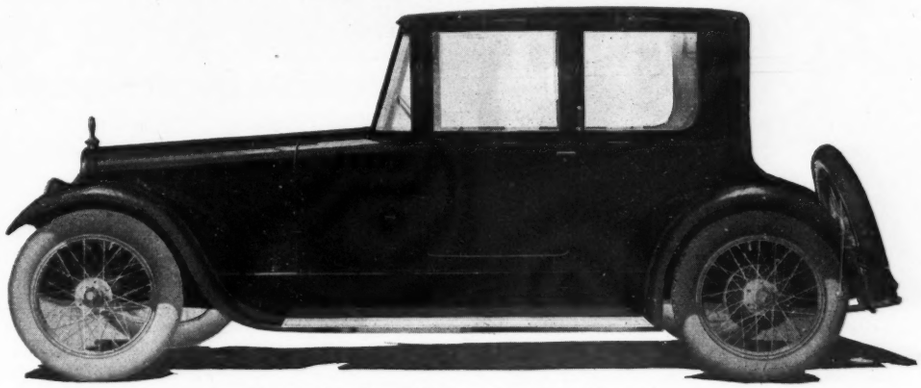
Hartford, Wis., Aug. 25—The performance of a Kisselkar Hundred Point Six stock model on the Pacific Coast demonstrated the possibility of mobilizing an army at any given point on the coast in 72 hr. with good roads and less than 100 with the present ones and also won for it two trophies while doing it. A message was delivered to Governor Cantu of Tiguana, Mexico, after a trip of 2023 miles straight down the Pacific coast in 92 hr. and 4 min. running time. The car carried a message from Mayor Tood of Victoria, B. C., and military dispatches from the commandant of Fort Lawton, Wash., to the commandant of Fort Rosecranz, San Diego, Cal.

The car used 140½ gal. of gasoline, an average of 14½ m.p.g. The Washington State trophy cup was won when it crossed the state of Washington, 417 miles, in 2 hr. and 12 min. Finishing the entire distance from Blaine, Wash., on the Canadian boundary line, to Tiguana, Mexico, in 7 hr. and 50 min. short of the 100 hr. alloted, it won the Defense League trophy cup. Hal Stone, Vanderbilt cup contender six years ago, drove. R. W. Emerson, secretary of the Pacific Coast Defense League, and D. L. Stone, official observer, were passengers. Data for the military defense highway was gathered.

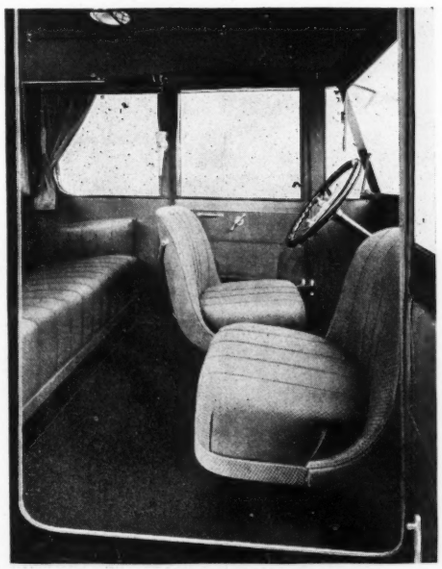
The Defense League, which sponsored the run, was organized in January to interest the government in a Pacific Coast defense highway connecting in one line all the strategic points of the Pacific Coast so that in time of danger communication could be obtained quickly and continuously.



The seven-passenger Jordan sport limousine ordinarily would be taken for an individual custom job



The four passenger Jordan brougham takes the place of a coupe and is similar in some respects



The interior of the Jordan four-passenger brougham, showing seating arrangement

U. S. RUBBER EARNS $25 PER SHARE

New York, Aug. 25—United States Rubber Co. will earn at least $25 a share on the junior issue of 1917, on the basis of the earnings of the company for the first half of the current year. Tire and mechanical sales alone amount to $90,000,000. These figures compare with $76,000,000 in all 1916.

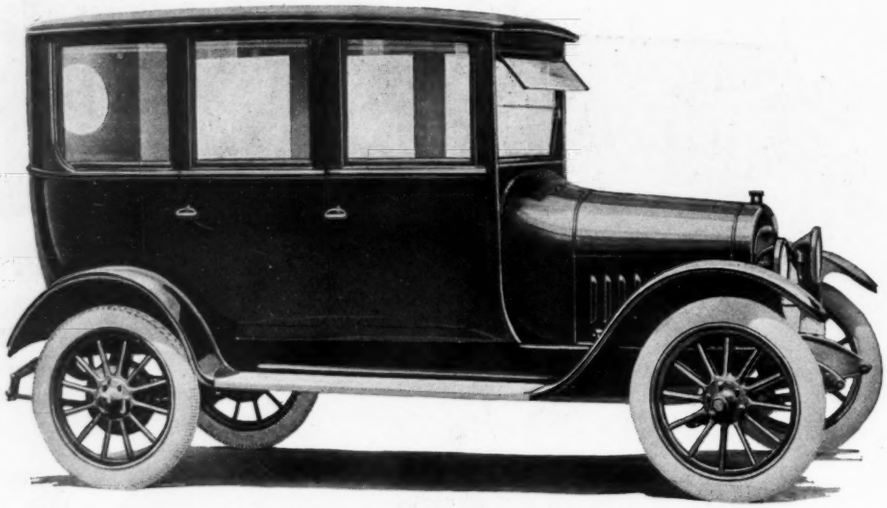
The company is paying only 17 cents a pound for its crude rubber, compared with 65 cents on the market. It has about $10,000,000 invested in its far eastern plantations. About 15 per cent of crude rubber requirements will be taken care of this year from its own plantations. This percentage will be increased to 25 per cent in 1918. By 1921 the company should get about half its crude rubber requirements from its own land.

FRANKLIN PRODUCTION TRIPLES

Syracuse, N. Y., Aug. 25—Since the United States entered the war the business of the Franklin Automobile Co. has showed greater volume than the entire business during 1916. The factory, which during the last year has been practically doubled in size, is running full blast, and production is at the rate of 12,000 cars a year, three times the production rate in 1916. By the middle of June, production for 1917 had exceeded the total for 1916, and orders on hand have kept ahead of shipments from six to ten weeks. The biggest single day's shipment in the history of the Franklin was Aug. 17, sixty-four cars; the biggest week, that of Aug. 10, 268 cars.

Same Maxwell Model But Improved

Body and Chassis Refinements Mark 1918 Line of Five



1918 Maxwell sedan, which sells at $1,095

WITHOUT change of model, the Maxwell Motor Co., Inc., Detroit, has made several important changes on the Maxwell 25 chassis, which has been its sole product since 1914. Minor improvements have been made each year, but the 1918 Maxwell is improved in both body and chassis. The chassis has been lengthened gradually since its introduction.

The latest refinements add to the appearance of the cars. The body lines are more attractive and blend well into the cowl and hood. Full crown, one-piece fenders and a sloping windshield are used. In fact, the body lines have been altered considerably.

Besides the body refinements changes have been made on the Maxwell 25 chassis. The ignition and starting units remain the same, with a change in the wiring system. A straight 12-volt, single-wire system now is being used on the starter and lights. This method makes for simplicity.

Redesigned Starting Switch

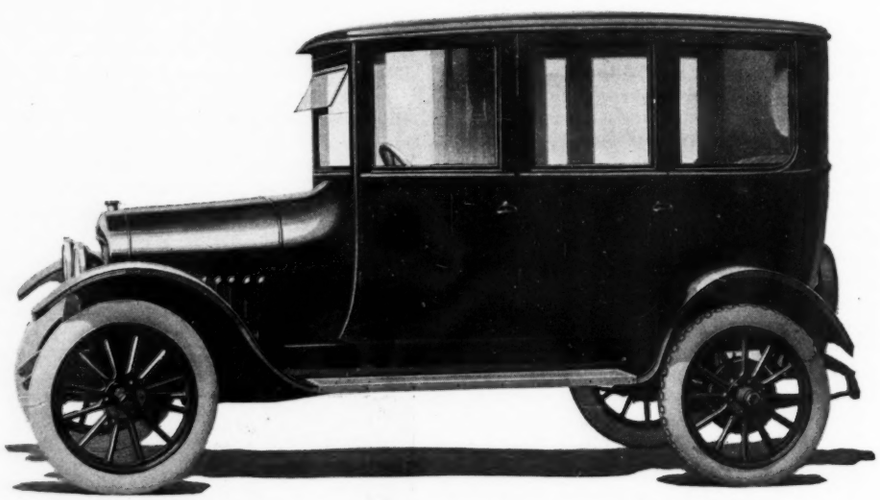
The electrical starting switch has been re-designed and is far more simple in construction and action. It is now only a single-pole switch. The starting pedal operates this switch and meshes the starter gear with flywheel. This pedal has an automatic magnetic lock attached, which prevents the starter gear from being thrown in mesh while the engine is in motion.

Other than widening the fan belt there has been no change in the engine. The fan belt also drives the generator. By using this method the use of the often troublesome overrunning starter clutch is eliminated. The wheelbase has been lengthened from 103 inches to 109 inches. This, in addition to giving more body room and a refined appearance, makes it a smoother-riding job. A 6-in. channel frame is used. The unsightly splash guards are dropped from the car. The result of the change is a much wider runningboard.

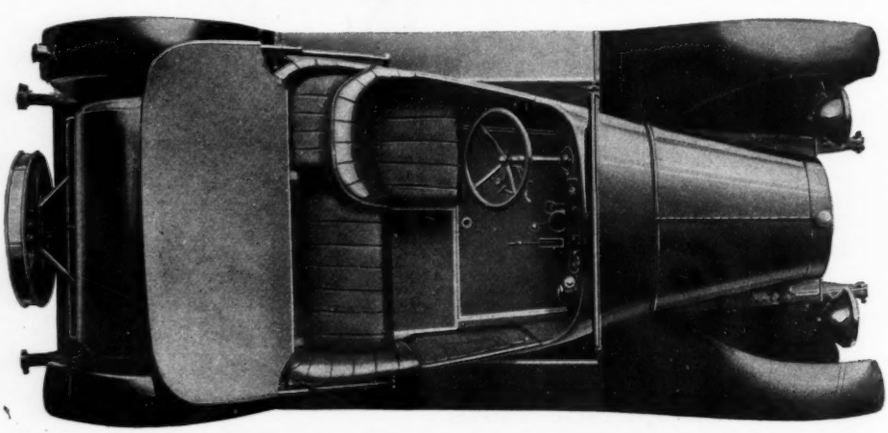
There has been a great improvement in the rear spring by building a compensating underslung spring from a new design. Instead of the three-quarter scroll elliptic the half-elliptic compensating underslung spring is used. The spring is 49 in. in length, and its being hung under the axle makes the car lower and greatly facilitates handling on country roads.

The Maxwell chassis is equipped with five different styles of bodies. They are the five-passenger touring, staggard-seated three-passenger roadster, six-passenger Berline, three-passenger coupe and the sedan. The roadster and touring cars sell for $745 each, while all the closed types are priced at $1,095. A winter top job sells complete for $855.

The Maxwell powerplant is a four-cylinder L-head block of 3⅝ in. by 4½ in. in cylinder dimensions, giving a piston displacement of 185.8 cu. in. It is oiled by a circulating splash system, cooled with thermo-syphon and has Simms-Huff lighting and starting with Atwater Kent ignition. The carburetor is a K. D. fed by gravity, the clutch is a cone, driving through a selective gearbox in unit with the engine to a three-quarter floating rear axle, made by the Maxwell company. The torque is taken by a torque tube. The tires are 30 in. by 3½ in., and the wheelbase, as stated, is 109 in.



The 1918 Maxwell Berline, a six-passenger at $1,095



Layout of interior of the three-passenger Maxwell roadster

Lapeer Turns Around in Own Length

Tractor - Truck Outfit Lends Itself Especially to Traffic Driving

The Lapeer tractor-truck consists of two units, the tractor that does the hauling and the trailer that carries the load

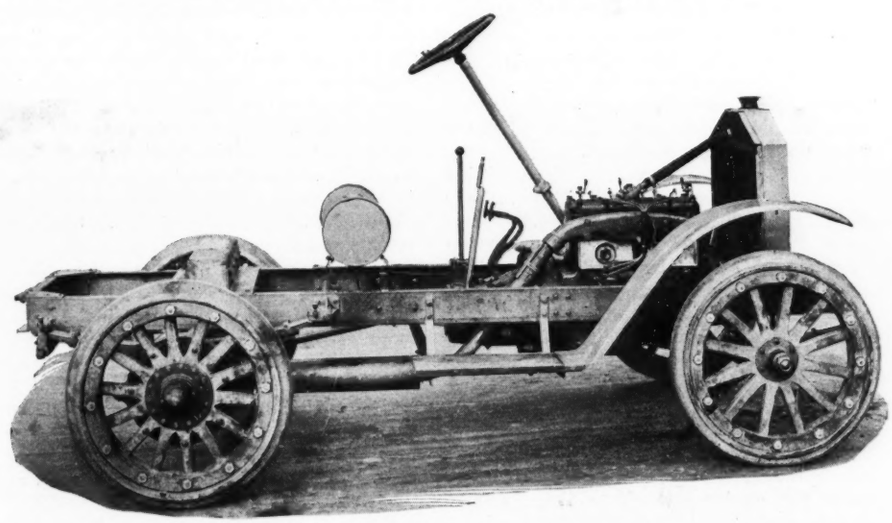
EFFICIENCY and economy in motor truck operation has been sought in the introduction of the Lapeer tractor truck, made by the Lapeer Tractor-Truck Co., Lapeer, Mich. The outfit is composed of two units, the tractor that does the hauling and the trailer, which carries the load. Any sort of trailer can be furnished, in any capacity from 1 to 5 tons. Also any kind of body can be fitted—dump bodies for coal, sand, etc.; stake bodies for lumber and underslung bodies for bulky articles or machinery.

The trailer can be attached or detached in a minute without the aid of an extra man. The trailer is fitted with rollers that run over an inclined track on the tractor. Further, the trailer has a standard that drops to the ground and keeps the body level when it is detached from the other unit. When coupling, the tractor is backed to the trailer, the rollers meet the inclined track and the tractor is then backed under the trailer until the coupling hits the top. One pin is then inserted and the two units are intact. Both the draw bar and turntable connections are through coil springs that take up the stress and strain when starting or stopping.

It is to traffic driving that the Lapeer tractor truck especially lends itself, it is said, due to the fact that it can be turned around in its own length, can turn sharp corners in crowded streets or be backed up to the curb with the tractor unit at right angles to the trailer in much the same manner as a team of horses is placed when a teamster backs up to a curb.

Inspection of the chassis reveals such standard units as the Torbensen rear axle, Fuller transmission and Waukesha engine. Carburetion is effected by a Stewart carbureter and the ignition is taken care of by a Splitdorf-Dixie magneto. The standard trailer chassis is designed to take a body 6 by 12 ft. The wheelbase of the tractor is 90 in. and the tread standard. The engine, having a bore and stroke of 3½ by 5¼ in. respectively, is three point suspended and fitted with a built-in governor. Lubrication is by pump and splash. Cooling is by centifugal pump, radiator and fan. In unit with the engine is a dry plate, multiple disk clutch and the transmission is three-speed selective type. The weight of the tractor unit is 3050 lb.

The tractor has a comfortable cab which affords protection to the driver and is equipped with a ventilating rain-vision windshield. The windows in the doors can be lowered and for summer driving the doors themselves can be readily detached. Standard finish is carried out in a lead color. The equipment includes besides the driver's cab, tools, oil side and tail lamps, jack and horn. The 2-ton Lapeer tractor and trailer, without trailer body, sells for $1,800, the 3½-ton for $1,900 and the 5-ton for $2,000. Extra trailers can be had at an additional cost of $400 for the 2-3 ton size and $500 for the larger sized tractor.



Chassis of Lapeer tractor, to which the trailer is attached to carry the load

TWO WOLVERINE MODELS

Kalamazoo, Mich., Aug. 24—The Wolverine Motors, Inc., of this city, is bringing out, as has been announced, the new Speedway Special car in the form of roadster and touring models. The roadster has two-passenger capacity and sells for $3,000, and the touring car seats four with two extra folding seats, and sells for $3,250.

The wheelbase of the roadster is 115 in., and the touring car, 125 in. The car will be fitted with a Wisconsin powerplant, having four cylinders cast in block. The bore is 3 3/4 in., and the stroke 6 in. The carbureter is a Rayfield, and the ignition system is a Bosch. The power is transmitted through a multiple-disk dry-plate clutch and a Warner gearset in unit with the engine.

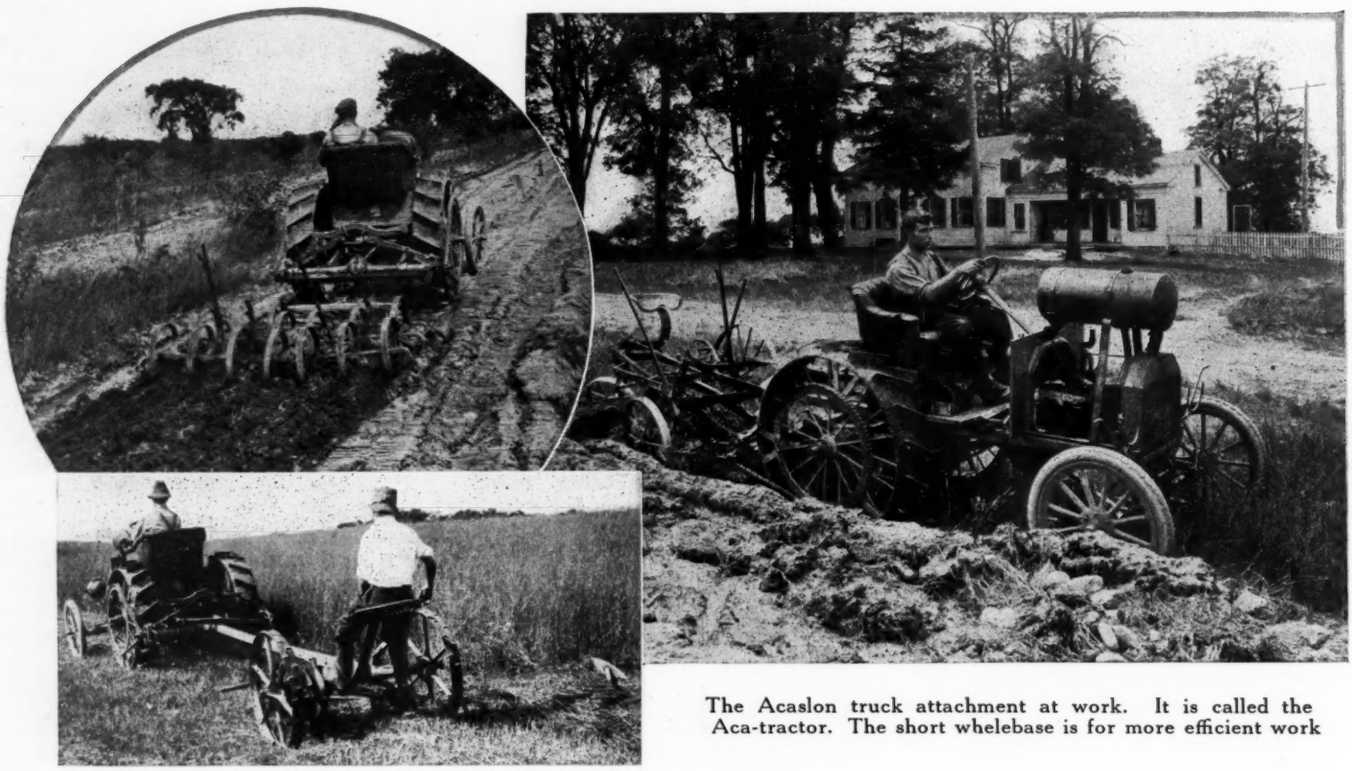
Final drive is by a special bevel axle made by the American Ball Bearing Co. This is a floating type and is geared 2.94 to 1 on the roadster and 4.1 to 1 on the touring model. The tires are 32 by 4½ in. all around and are cord type. The drive is transmitted through the springs, which are semi-elliptic. The Lavigne steering gear will be used, and a Warner speedometer and Hartford shock absorbers also will be stock equipment.

FOUR-WHEEL CHANGES NAME

Clintonville, Wis., Aug. 24—The Four Wheel Tractor Co., organized several months ago at Clintonville, Wis., to manufacture general utility tractors employing a four-wheel drive, has been re-organized as the Topp-Stewart Tractor Co. and the capital stock increased to $500,000. Ground was broken this week for the first unit of the plant, situated on a tract of 100 acres adjacent to the holdings of the Four-Wheel-Drive Auto Co. It is hoped to have the shops ready for operation early in November. The main building will be 66 by 176 ft. The Topp-Stewart tractor is being manufactured temporarily under contract with a machine shop at Waukesha, Wis.

Acason Makes Ford a Tractor

Attachment Can Track in the Furrow and Thus Reduces Pull in Plowing



The Acaslon truck attachment at work. It is called the Aca-tractor. The short whelebase is for more efficient work

A FORD chassis can now be converted into a tractor by the addition of the attachment made by the Acason Farm Tractor Co., Detroit. Due to the fact that the driven wheels are placed ahead of the Ford rear axle, the tractor has a short wheelbase, which makes it valuable in plowing and other field operations. The tractor is called the Aca-tractor and one of its features, the makers state, is that the drive strain is distributed over several teeth in front and rear sprockets, so that breakage of a tooth in either does not put the machine out of commission. The Ford rear axle is strengthened by a channel beam to prevent danger of springing it.

Tracks in Furrow

By setting the drive wheels close to the frame, the front and rear wheels track in the furrow. This tends to reduce the pull in plowing. To attach the machine to the Ford chassis requires about 3 hr. No holes need be bored in the chassis and it is only economy to put four clamps in place and a total of ten nuts. No changes are made in the mechanism of the Ford. It is not claimed for this machine that the farmer is able to use his Ford for pleasure purposes while the attachment is in place but this is offset by the fact that with the attachment a clear view of the implements is given while working in the field, and this is not the case where the body remains on the chassis. The standard attachment sells for $265 and a steel seat sells for $5 extra. This attachment was exhibited at Fremont, Neb., during the tractor show Aug. 6 to 11.

It will be noted that the drawbar attachment is at the center of the converted Ford chassis, thus having the effect of holding the front wheels on the ground. It is claimed that with the lighter type of tractors it is a common failing that the front wheels are lifted from the ground due to the force of the drive and the drawbar pull. A study of the attachment shown herewith will bring out the fact that in pulling the trailer the front wheels are held on the ground by virtue of the fact that the drawbar attachment is forward of the rear wheels which act as a pivot point upon the ground.

The drive is by chain with a pinion sprocket fitted to the ends of the ordinary Ford axle and a large ring sprocket connected to the drive wheel. The reduction between the sprocket and the drive wheel is 39 to 1. The starting shocks are claimed to be more easily absorbed by the use of the chain-drive and it is claimed that the rear spring absorbs the starting torque.

Probably the greatest difficulty which Ford tractor attachments have had to contend with is in the supply of cooling water. The method used in the Aca-tractor to increase the radiator capacity is to mount above the engine a tank holding 11 gal., making a total of 16 gal. of water in circulation. Another provision made in meeting the troubles which beset the farm tractor, is the use of the Bennett air cleaner. This is an air washing arrangement which is in common use on tractors.

MUSKEGON 2-TON OCT. 1

Muskegon, Mich., Aug. 22—The Muskegon Engine Co. will start the manufacture of a 2-ton commercial truck on production of twenty-five a month Oct. 1. The company now is erecting a factory. Irving P. Miller, factory and sales manager and member of the United States truck standardizing committee, states that the firm will bid for the manufacture of government trucks. The company has 800 stockholders and a capitalization of $150,000. C. E. Johnson, of the Piston Ring Co., is president and general manager; J. A. Mohrhardt, vice-president, L. H. Shuh, secretary and treasurer.

The truck will be called the Muskegon motor truck, Model 20. The engine will be a Continental model C, four-cylinder, three-point suspension. The radiator will be of the armored type; rear axle Torbensen type C., internal gear, and the springs will be of chrome vanadium steel. The wheels and tires will be of the artillery type, with dual rear tires of hard rubber. The wheelbase will be 114 in. and the weight of the chassis will be 4250 lb. Stake type body 12 ft. long and 66 in. wide, or open express type with or without top.

The Motor Car Repair Shop

To Keep Your Car Shiny

THE best preparations to use in keeping the finish of a motor car looking like new are clean water and plenty of care. It should be remembered that several different kinds of finish are used in different parts of high grade cars and that each kind of finish should have its own brand of treatment in the course of a washing. On one high priced car, for example, the radiator shell, lamps, instruments, and steering post are nickeled; the hood, fenders and rims are enameled; and the body has a very fine finish of paints and varnishes.

The first thing to do in washing a car is to give it a thorough flushing with a low-pressure stream from a hose. The purpose of this is to gently flow off the accumulated dust and dirt in such a way that the hard particles will not scratch. In some cases the mud will stick hard enough to resist the stream from the hose, and when this occurs the particles should be quickly sopped off with a wet sponge.

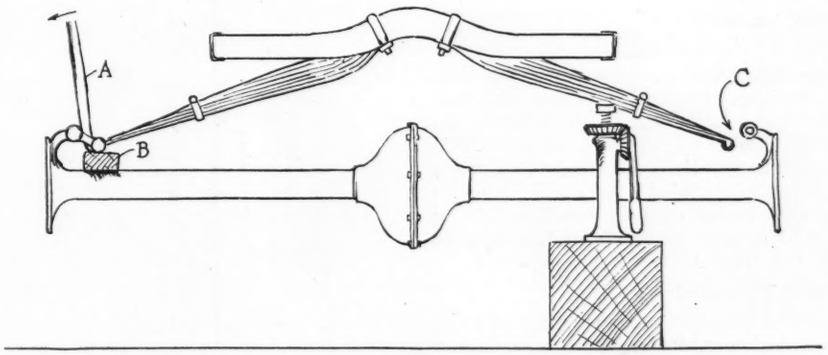
The second step is to go over all parts of the car with a clean sponge and cold water, to remove any grease or dirt remaining. Soap may be used if necessary, preferably a pure castile soap.

Then another thorough flushing should be administered, taking care that soap used in the second step of the bath is not permitted to dry, for it will leave streaks and spots that are difficult to remove.

After all vestige of dirt has been removed, the polishing begins. Two chamois skins should be used; one for radiator, hood, tops of fenders and body; the other for the chassis and under sides of fenders. The rubbing with the chamois should be accompanied by frequent rinsing and wringing out the chamois so that no grit may possibly scratch the polished surfaces. In rubbing, a long, smooth, easy motion should be used. Plain cold water, a judicious application of soap, and plenty of care are without rivals in preserving the finish of a motor car; whether it be the top, the leather cushions, the varnished body, or the enamelled fenders. A non-scratching polish may be used on the nickeled parts. Gasoline should never be employed in cleaning either the top, body, or any other parts where a lustrous finish is desired. Care in washing a car is well worth while, for it pays a big return in appearance.—Roy T. Bartholomew, Lansing, Mich.

Fitting Ford Rear Springs

Whenever there is an occasion to remove the rear springs of a Ford car, it is usually a difficult job for the average owner to get them back in place again. One end can, as a rule, be quite easily secured by slipping the links or shackles in the eye of the spring and the spring perch on the axle, but then the other end is altogether too far away from the perch on this side of the car. The trick is to deflect the spring enough to bring the eye on the loose end to such a distance that the shackle or hanger bolts can be slipped in place.



Sketch showing how rear springs can be fitted to a Ford car

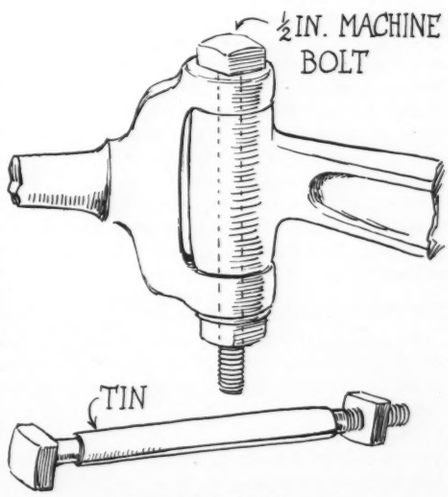
One way of doing this is to get a short pinch bar A or something similar and insert it in the hanger at the end that has been coupled up and pulling on the handle of the bar in a direction away from the car. This will force the spring over and at the same time raise this end high enough so that a block of wood B can be slipped under it, resting on the axle housing.

The other end of the spring will now have been forced closer to the perch supporting it and the only thing left to do is to raise the spring high enough so that the bolts of the hangers can be slipped in their places. This is accomplished by placing a large block of wood or box under the axle and on top of this a jack, adjusting the latter so that it will catch the spring as shown in the illustration. If the jack is now raised the space C will gradually diminish and finally reach the point where the distance between the center of the spring eye and perch will be correct for the hangers. After the latter have been placed properly, remove the jack and also the block of wood B, after which the job is done.

Roadside Repairs

A small two-passenger roadster attempting to pass a car on the road was ditched and sheared the left front steering spindle-body bolt. The accident caused the tie rod to be bent and the car lay with the left front wheel under it. It looked like a case of being carried to town on a truck, but here's what the driver did.

First, the front of the car was raised with the jack so that the parts were easier to get at. Then the bent tie rod was removed from the steering spindle arms at each end and straightened. The spindle remaining in the wheel, together with the spindle arm were intact and the only difficulty seemed to be in getting a suitable bolt or pin to take the place of the broken one. A nearby farm house offered a solution. A long machine bolt ½ in. in diameter was procured, the only one available, but this was a little too small for the hole in the axle end and the spindle. Close by lay a tin can and with the aid of a pair of tin shears, carried in the tool box, part of the can was cut out and wrapped around the bolt to take up most of the play. The bolt with the tin bushing around it was then inserted in place of the sheared bolt and plenty of oil and graphite packed around it. By driving slowly the owner got safely to town, 8 miles away, where a new bolt was secured.



This week's roadside repair

The Accessory Corner

Maltby Primer

THE Maltby Auto Specialty Co., Detroit, is marketing a primer for motor cars and tractors. This primer takes the fuel from the feed source and sprays it into the intake manifold with such force that it breaks into countless globules, which, when mixed with the air, form a fuel mixture that makes for ease in starting. It is made to operate either from the dash or from the front of the radiator.

Hoosier Valve Grinder

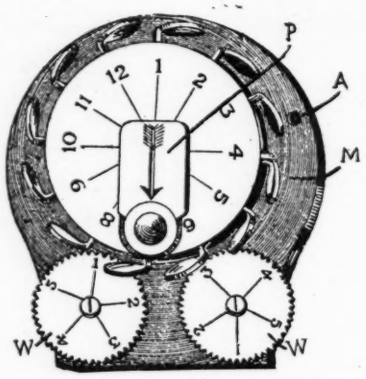
A valve grinder that is simple, light and speedy is benig marketed under the name Hoosier by William Lynn & Co., 127 North Davidson street, Indianapolis, Ind. By see-sawing back and forth five complete revolutions can be made to a fraction of an inch. The outfit consists of a shaft with spools attached, a spring for raising the valve, a bow, one reversible bit and a blank for cutting out different sizes of bits. Movement of the bow actuates the string which passes around the spool and an oscillating motion can be had at any section of the string while the valve never stops at any one point twice. The tension of the string can be made tight or loose. If the tension of the string is slackened this will cause the string to slip if the operator presses too hard, while if the string is tightened the operator can press as hard as he desires and the string grips a tighter hold on the spool. The outfit sells for $1.25 on a ten-day trial, money-back guarantee.

Gas Gage for Fords

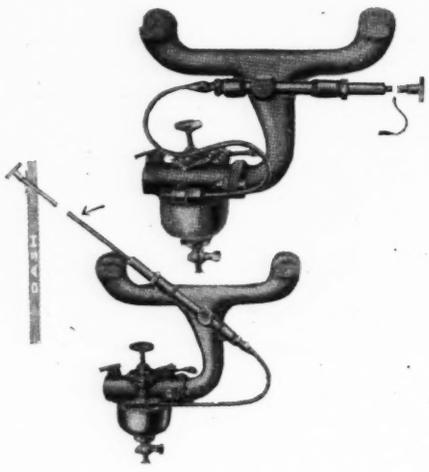
For the Ford owner who wishes to ascertain how much gasoline there is in the tank, the Ever-Right Products Corp., 1770 Broadway, New York, has a measuring device which consists of a cap that takes the place of the usual tank cap, through the center of which is placed a metal standard, nickel-plated, having at the lower end a cork float that is shellaced and guaranteed not to log. Before the seat cushion is put in place the standard is pushed down and locked in place with a swivel lock. When a reading is required the lock is released and the cork raises the standard until the cork rests on top of the gasoline. A series of notches in the standard marks off the gallons. By these notches it is as easy to determine the amount of fuel in the tank in the dark as in daylight. Further, there is no necessity of measuring with a stick which may or may not be dirty and leave foreign matter in the tank to bring carbureter troubles. The device sells at $1.

Tip-Top-Ti-Re-Pair Equipment

The type F, self-contained vulcanizer equipment, made by the Akron Rubber Mold & Machine Co., Akron, Ohio, has been advanced in price $25, now listing at $150. The equipment consists of two cavities, 2½ by 3 and 4½ by 5, with a reducing shell to take 3½ by 4, on which practically all sizes of inside work can be done. Bead molds in each of the sizes mentioned for either quick detachable or straight-side tires are furnished with this equipment.



Wehner keyless lock for Ford cars



The Maltby primer, showing two methods of attaching

Steelite

Under the name, Steelite, the Inland Electric Co., Chicago, is marketing portable lights with fixtures, these entire outfits being designed to reduce fire hazard. The portable cord is constructed with the two electrical conductors incased in a solid jacket of rubber covered with a saturated, waterproof braid, while over this is an armor of steel ribbon with interlocking flanges which give it maximum strength and flexibility. An outfit such as might be required in garages and like places costs $12.60. This includes 25 ft. of cord and one plug.

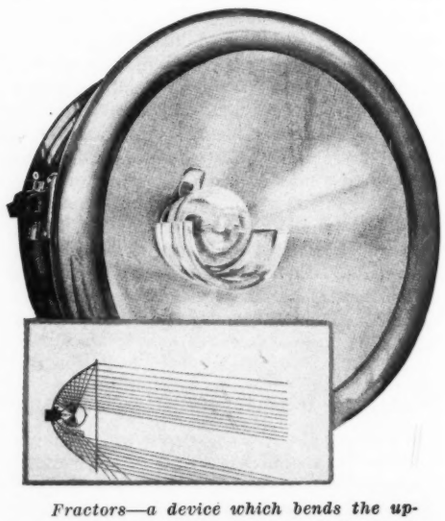
Wehner Keyless Lock

A keyless lock for Fords has been patented by George Wehner, 420 Habersham street, Savannah, Ga. Referring to the illustration, plunger, P, protrudes about a quarter inch. To unlock press three or four selected buttons and the plunger will sink in the lock, reach the switch which can be turned to magneto or battery. To lock, bring switch to its neutral position with arrow pointing downward and turn a half revolution. The lock is said to be such that it can be attached in 2 min. The movable plate, M, is controlled by two combination wheels, W and W. There are three perforations in the plate, of which only one, A, is visible. When the two combination wheels are set at their proper numbers the plate can be turned so that the three perforations will expose the three screws which hold the lock to the switch. The lock can be adapted to any make of car, it is said.

The Hydro-Eye

The Hydro-Eye, made by the Hydro-Eye Co., 1916 Broadway, New York, is a device designed to deliver to the engine the proper amount of moist air without any

The Hydro-Eye, by the use of which moist air is injected into the cylinders



Fractors—a device which bends the upward rays of light down on to the road.

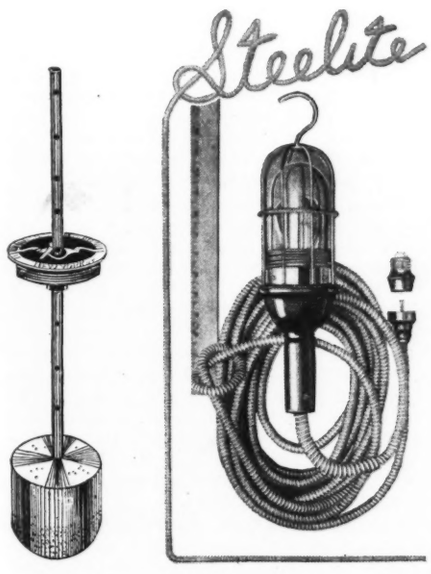
attention from the operator. The device is tapped into the intake manifold and to the other fitting, seen in the illustration is attached a flexible tube that runs to the radiator and is brought even with the filler opening. The opening in this tube is placed higher than the overflow pipe opening in the radiator so that water will not be taken into the manifold, but rather the moist air coming off the water. When the engine is running at its lowest speed the high vacuum in the manifold pulls the diaphragm against the adjusting screw in the Hydro-Eye, which closes the opening in the diaphragm. As the engine is accelerated the vacuum in the intake manifold is decreased, allowing the diaphragm to return to its normal position, permitting the free passage of the moist air through the opening. There is a glass in the center of the device through which the action of the diaphragm may be seen. The device provides an easy method of priming the engine when cold, or of flushing the cylinders with water; simply remove the filler cap and pour the required amount into the tube. This device is designed for use on any car and the price including fittings is $12.50.

Old Honesty Gasoline Pump

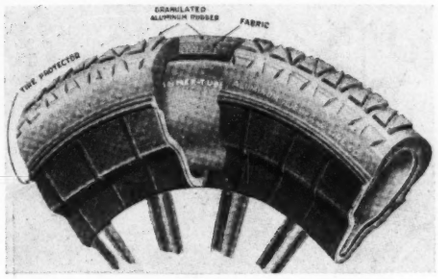
The Indicator Gas Sales Co., Ionia, Mich., is marketing a gasoline pump by which the motorist can see just what he is getting and whether he gets the full quantity or not. There are two glass cylinders on the pump which the pump fills before the fuel is admitted into the tank of the car. Lines mark off the gallons and when one cylinder is full the other is always empty. One tank is always full. By turning a lever the tank is drained, the contents going into the car tank.

Fractors

The Crew Levick Co., Philadelphia, Pa., makes a device for controlling headlights which is called Fractors. Instead of dimming the lights, Fractors take the rays which otherwise would go upward and add them to those that go straight ahead. Not only do they eliminate glare, but they concentrate the light and place it where light is most needed—down on the road. Fractors operate on the same priciple as the original lighthouse lens. They slip in back of the bulb and bend and multiply prismatically the rays of light. To attach remove the bulb, pass the Fractor over the lamp socket and replace bulb.

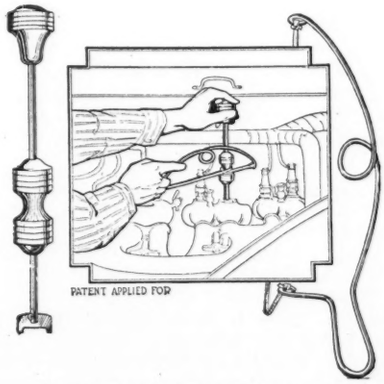


Left—The Ever-Right gasoline gage for Fords. Right—Steelite, guaranteed against short circuits



Tire with granulated aluminum to give longer life

Old Honesty gasoline pump, by which motorist can see that he gets full measure



Hoosier valve grinder, light and speedy

Granulated Aluminum Tires

By putting rubber through a mixing machine and adding fillers, then calendering through hot rollers to give it sheet form, aluminum is virtually vulcanized into the rubber and of this rubber tire treads are made by the Aluminum Rubber and Tire Co., Chicago. The granulated aluminum is guaranteed not to cut the rubber and to give the tire long life. This is a new concern with offices at 11 South La Salle street, Chicago, and the company will be in full production soon.

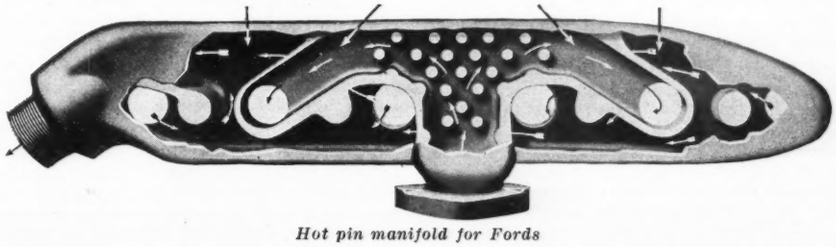
Hot Pin Manifold

The Hot Pin manifold for Ford cars is built on a principle which is said to make it impossible for gasoline to reach the cylinders without being vaporized completely. It derives its name from the pins, or studs, cast on the inside of the manifold casting. These pins are as hot as the walls of the casting and project toward the center of the manifold in such a way that every atom of the mixture must touch either the side wall or the hot pins before reaching the engine. The result is that the mixture reaches the chambers in the form of completely vaporized gas instead of air and gasoline spray, it is claimed. The saving in gasoline is said to be from a third to a half. At present the Hot Pin manifold is made only for Ford cars, but it soon will be ready for other makes. The manufacturer is the Kerosene Burning Carburetor Co., Detroit.

G. M. SEES $30,000,000 INCOME

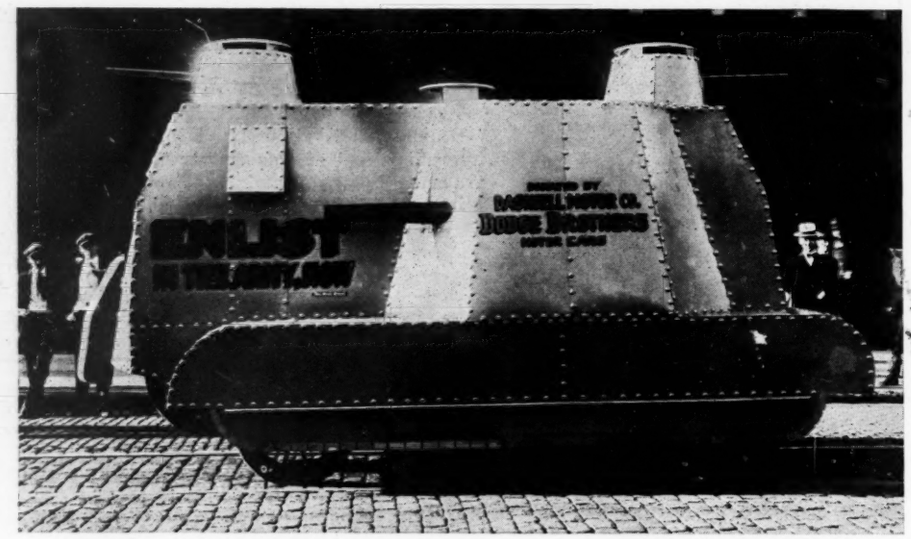
New York, Aug. 24—The General Motors Corp. held its organization meeting in this city yesterday and elected W. C. Durant president. Pierre S. duPont was elected chairman of the board; T. S. Merrill, secretary; H. H. Rice, treasurer, and M. L. Prensky, controller.

After the meeting of the directors it was stated that for the fiscal year to end with the close of the current month the General Motors Corp. will show net income of approximately $30,000,000. This will be sufficient to pay the 6 per cent dividend on the preferred stock and leave a balance equal to about 35 per cent on the $82,600,000 outstanding common stock. The sale of cars for the year will be approximately 185,000. Arrangements have been made for an output of 250,000 cars in the coming fiscal year. The Buick company is now turning out 465 cars a day of the new model.



Hot pin manifold for Fords

Among the Makers and Dealers



A DEALER PUTS A PUNCH IN CHICAGO RECRUITING—This war tank enlisted in the recruiting service in Chicago. It attracts much attention with its substantial armor and khaki-clad soldiers. The Dashiell Motor Co. of Chicago was the donor

ZENITH Carburetor Promotes Jackson—Frank R. Jackson, who has been with the Zenith Carburetor Co. of Detroit since its organization, has been promoted to the retail sales managership.

$55,000 Assembly Hall for Employees—The Hydraulic Pressed Steel Co., Cleveland, Ohio, will erect a building containing a restaurant and assembly hall for its employes at a cost of $55,000.

Studebaker to Build Power Plant—The Studebaker Corp. of South Bend, Ind., has awarded a contract for the construction of a power plant 123 by 87 ft. The plant will be of steel and brick construction, and will cost about $100,000.

Frederickson Leaves Famous Truck—C. E. Frederickson, vice-president and general manager of the Famous Trucks Corp., St. Joseph, Mich., has resigned, on account of pressing business interests in Chicago. For the present Frank N. Wilkinson will act as manager. No definite program has been outlined.

Nashville Dealers Elect Officers—The Nashville, Tenn., Automobile Trade Association has elected the following officers: W. Murray Hogan, manager of the Imperial Motor Car Co., president; Lyon Childress, Pennock Motor Co., vice-president; L. M. Hirsig, Hirsig Auto Supply Co., treasurer, and F. L. Sanderson, secretary.

Woodward Becomes Republic Rubber G. S. M.—H. J. Woodward has been appointed general sales manager of the Republic Rubber Co., Youngstown, Ohio. Mr. Woodward formerly was with the Diamond Tire Co. The Zenith Carbureter Co. is building an addition to its present factory which will permit an increase of 80 per cent in production capacity.

Rubber Representatives Organize—To secure a better understanding with railroads as regards freight matters and to insure proper rates on crude rubber and on finished rubber products, the representatives of rubber companies in Ohio have organized the Northeastern Ohio Rubber Shippers' Association. R. G. Kreitler, traffic manager of the Goodyear Tire & Rubber Co., is chairman of the executive committee of the new traffic body.

Lapeer Truck to Erect Factory—The Lapeer-Truck Co., New Haven, Mich., has purchased 8 acres of land and will erect a new factory.

G. M. Truck Promotes Trumbull—J. C. Trumbull has been promoted to the position of assistant manager of the New York branch of the General Motors Truck Co.

White Co. Builds Addition—The White Co., Cleveland, Ohio, is building a $300,000 addition to its factory, which will be 125 by 500 ft., of concrete and steel and two stories high.

Conestoga Truck to Build Plant—The Conestoga Motor Truck Co., Lancaster, Pa., will build its first plant here, to be ready for operation Oct. 15. For the present Conestoga trucks will be assembled in temporary shops.

Day to Manage G. M. Truck Sales—V. H. Day has been appointed sales manager of the General Motors Truck Co., Pontiac, Mich., in the truck division, with headquarters at Pontiac.

Welles to Supervise Lexington District—C. P. Welles, Dallas, Tex., has been appointed Southwestern district sales manager of the Lexington-Howard Co., manufacturer of the Lexington motor car. He will have his headquarters in Dallas.

Duplex Truck to Help Harvest—The Duplex Truck Co., Charlotte, Mich., has arranged so that its 200 employees can devote one day in August for co-operating in harvesting with the farmers in the territory surrounding Charlotte.

Los Angeles Studebaker Changes—Paul G. Hoffman has been appointed general manager of the Los Angeles branch of the Studebaker Corp. A. W. Crossman, who was formerly general manager, has returned to the Studebaker factory to fill a sales position.

Schroeder to Make Motor Car Headlights—The Schroeder Headlight Co., Evansville, Ind., heretofore engaged in the manufacture of locomotive headlights exclusively, has announced a line of motor car headlights and searchlights, which will be placed on the market soon. A. M. Weil, an Evansville capitalist, has purchased controlling stock of the company and will be its president.

Olin to Manage Jackson Branch—Bruff W. Olin has become manager of the Jackson branch at Grand Rapids, Mich., and will control the distribution of Jackson cars in western Michigan.

Sweet with G. M. Tractor Division—R. A. Sweet has been appointed sales manager of the tractor division of the General Motors Truck Co., Pontiac, Mich. Mr. Sweet formerly was with the Liberty Motor Car Co.

Aluminum Castings Co. Adds—The Aluminum Castings Co. is building an addition to its plant, which will be twice the size of the present building, and expects to begin operations in the new plant about Sept. 1.

Herbert to Represent Detroit Truck—M. B. Herbert has been appointed special sales representative of the Detroit Truck Co. Mr. Herbert formerly was in a similar position with the Smith Motor Truck Corp.

Knobloch Resigns from Cole—A. F. Knobloch, vice-president and general manager of the Cole Motor Car Co., has resigned. Mr. Knobloch was one of the founders of the Northway Motor & Mfg. Co. and has been in the industry for many years.

Reo Employs Medical Head—The Reo Motor Car Co. has appointed Dr. E. A. Planch head of the medical and surgical department. Formerly physicians were employed from private practices, but this plan did not prove satisfactory, as the doctors were not always available when desired.

McGookin Becomes Detroit Representative—Earl W. McGookin, formerly vice-president and sales manager of the Springfield Body Corp., has entered business in Detroit as the representative of the Macbeth Evans Glass Co., the Johnston Mfg. Co. and the Hayes Mfg. Co.

Grand Monarch Storage Battery Formed—The Monarch Storage Battery Co. has been organized at Grand Rapids, Mich., and will manufacture Monarch storage batteries. T. H. Lavier is president. It is expected that the company will employ between 100 and 200 men.

Seattle Dealers Elect Officers—The following officers were elected at the annual convention held in Seattle by the Washington Automobile Chamber of Commerce recently: A. C. St. Jchn, Centralia, president; A. C. Baldwin, Tacoma, vice-president; and C. L. Moore, Seattle, managing secretary.

Clinton to Sell Paige Retail—Fred D. Clinton, for several years associated with the Paige Motor Car Co., Detroit, as a district manager, has joined the Hoppe-Hatter Motor Co., Milwaukee, Wis., Paige distributer in Wisconsin and Upper Michigan, as general sales manager.

Lewis to Represent Hudson on Coast—C. G. Lewis has been appointed Pacific coast representative for the Hudson Motor Car Co., succeeding R. L. Barrett, who resigned to join the H. C. Harrison Co., Hudson distributor in San Francisco. Mr. Lewis formerly was foreman of the mechanical department at the Hudson plant.

Nordyke & Marmon Adds to Factory—A building permit has been issued to the Nordyke & Marmon Co., Indianapolis, Ind., for the erection of an addition to its plant which will be 200 by 90 ft. The company signed a contract with the Austin Co. about sixty days

ago for the erection of a one-story steel and glass addition 300 by 210 ft., and the new structure will be added to this building to provide a plant for the manufacture of airplane motors.

Maxwell Begins Canadian Plant—The Maxwell Motor Co. has started work on the construction of its plant at Windsor. The Canadian branch will supply Canada and the British Isles.

110 U. S. Trucks in Week—The United States Motor Truck Co., Cincinnati, Ohio, received orders for 110 trucks last week. This was the company's biggest week's business in its history.

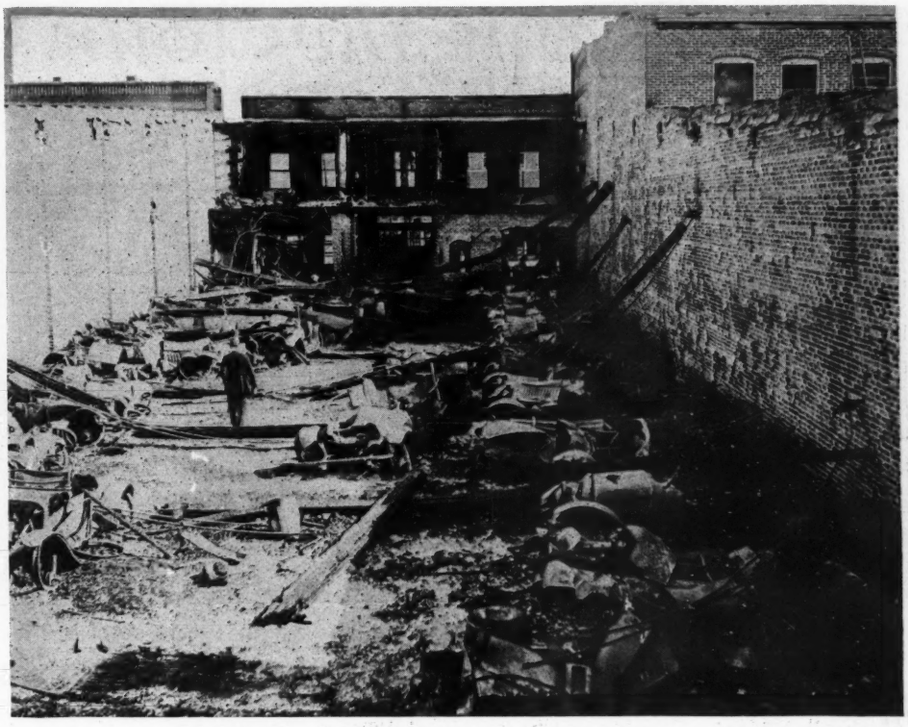
Rue Chicago Ford Dealer—H. Dale Rue, who has been connected with the Ford Motor Co. for eight years, has opened a salesroom and service department on motor row. He will handle the Ford cars and trucks at Chicago.

Drum to Direct Buick Body Division—Charles Drum will take charge of the Buick body department Sept. 1. At this time the plant which will be used for body building will be completed. Mr. Drum formerly was factory manager of the Springfield Body Corp.

Jenkins Vulcan Springs to Move—The Jenkins Vulcan Springs Co., St. Louis, Mo., will locate its plant at Richmond, Ind., as soon as possible. The company, which has a capitalization of $300,000, manufactures motor car springs. About a third of the stock is held by Richmond business men. The company's new plant will occupy an 80-acre site.

Indianapolis Row Elects Officers—The Automobile Row Association of Indianapolis was incorporated last week and the following officers were elected: President, Carl G. Fisher, head of the Indianapolis speedway; vice-president, William Esterley, Indianapolis manager of the Firestone Tire & Rubber Co.; secretary, T. W. Meyers, general manager of the Indianapolis speedway.

Barnes Foundry Obtains Site—The Barnes Foundry & Mfg. Co., the new $2,000,000 Detroit corporation, organization of which recently was announced in MOTOR AGE, has secured a 30-acre site in River Rouge and Ecorse. Erection of the plant will begin at once and production will start early this coming winter. The foundry department will be the first in operation, and as soon as it is installed completely the machine department will be added. The company will specialize in cylinders and pistons but will be in a position to make all types of gray iron castings.



FORTY-EIGHT CARS LIE IN THESE ASHES—Only eight of the forty-eight cars burned recently when an Oklahoma garage burned were insured. The loss was $100,000. The ruins show the fire must have reached the cars almost at once

Kapp to Manage Mitchell Advertising—Frank A. Kapp has been appointed advertising manager of the Mitchell Motors Co., Inc., Racine, Wis. Mr. Kapp has been with Willys-Overland, Inc., Toledo, Ohio, as manager of the creative division of the advertising department. He will assume his new duties Sept. 1.

Herschell-Spillman Builds Factory Addition—The Herschell-Spillman Co., North Tonawanda, N. Y., has well under construction another concrete building, 60 by 175, three floors, of which will be added to the regular factory, while the first floor will be made into a test room for engines. Accommodations for testing seventy-five at a time will be arranged. This will not supplant the old test room, simply being an addition.

Humphrey with Wright-Martin—S. H. Humphrey has been appointed general manager of the Wright-Martin Airplane Co., New Brunswick, N. J. Mr. Humphrey formerly was manufacturing manager of Chalmers, and later of Briscoe and Hupp.

Crow-Elkhart Opens New Building—The Crow-Elkhart Motor Co., Elkhart, Ind., has formally opened its new $40,000 administration building. The building is two stories high and covers a site 184 by 130 ft. A part of the lower floor is equipped as a salesroom and service station. Ten new body designs to be used on the company's 1918 cars were placed on display for the first time.

Recent Incorporations

Akron, Ohio—Avalon Rubber Mfg. Co.; capital stock, $50,000; to manufacture rubber articles; incorporators, T. S. Briggle, L. B. Turner, William W. Spears, J. F. Hower and G. H. Laumann.

Canton, Ohio—American Motor Car Co.; capital stock, $100,000; to make motor cars; incorporators, Clyde A. Volze, William E. Patterson, Adolph S. Vance, Jacob M. Glaser and Moritz Glaser.

Cleveland, Ohio—Weger Aeronautical Motor Co.; capital stock, $200,000; to manufacture all kinds of airplane and aeronautical motors; incorporators, H. H. Brelsford, C. B. Corlett, S. G. Feischer, A. L. Hammink and L. O. Osten.

Charleston, W. Va.—Clarksburg Tire Co.; capital stock, $25,000; to deal in motor cars, trucks and accessories; incorporators, W. H. Garrett, Ira D. Starkey, Henrietta Garrett, Freda Starkey and Agnes Garrett.

Cleveland, Ohio—Ohio-Nash Co.; capital stock, $100,000; to deal in motor cars; incorporators, Richard H. Lee, Fleming H. Crew, G. M. Gallagher, M. A. Marquard and L. R. De Groate.

Columbus, Ohio—Columbus Lift Truck Co.; capital stock, $200,000; to manufacture trucks; incorporators, F. H. Angell, S. A. Angell, J. S. Williams, C. C. Williams and D. H. Thomas.

Cleveland, Ohio—Cleveland A-B-C Starter Co.; capital stock, $10,000; to manufacture starters; incorporators, Ray W. Cudmore, H. L. Edwards and C. Edwards.

Cincinnati, Ohio—International Garage Co.; capital stock, $5,000; to operate a garage; incorporators, Olivia P. Schriner, Fred R. Hall, Richard F. Webster, John Webster and Ervin Fischer.

Detroit—Pioneer Trailer Corp.; capital stock, $30,000; incorporators, W. M. Cornelius, Samuel E. Leiderbrandt and Arthur F. Squires.

Flint, Mich.—Flint Storage Battery & Electric Co.; capital stock, $5,000; general garage business; incorporators, R. A. and J. A. Welch and H. F. Hanning.

Grand Rapids, Mich.—Quality Tire Shop; capital stock, $3,000; to retail and job motor car supplies; incorporators, E. W. Haas, B. W. Marlett and F. L. Pattison.

Grand Rapids, Mich.—Universal Auto Top Co.; capital stock, $25,000; to manufacture the Universal Auto Top; incorporators, Williams E. Pugsley, Leon S. Carrol, Clyde Vandenberg and Robert H. Luce.

Indianapolis, Ind.—Overland-Newcastle Co.; capital stock, $10,000; incorporators, T. F. Wright, E. A. Retz and William E. Messick.

Lansing, Mich.—Illinois Oldsmobile Co.; capital stock, $250,000; incorporators, W. W. Barton, W. C. Amble and D. T. Vriesema.

Lakewood, Ohio—Overland-Roth Co.; capital stock, $10,000; to deal in motor cars; incorporators, Patrick J. Mangan, Anna L. Roth, Mary Freeburn, Charles A. Mangan and Roy F. Roth.

Madison, Wis.—Hokanson-Buick Co.; capital stock, $50,000; to succeed Hokanson Automobile Co.; incorporators, Emil Hokanson, W. M. Thompson and Irma Hokanson.

Milwaukee, Wis.—Petley Rubber Co.; capital stock, $100,000; incorporators, James R. Petley, Lynn S. Pease and Louis M. Nahin.

Milwaukee, Wis.—Eckstein Auto Co.; capital stock, $10,000; incorporators, A. F. Eckstein, Louisa Eckstein and A. K. Stebbins.

Milwaukee, Wis.—Northwestern Battery Co.; capital stock, $40,000; to deal in and repair storage batteries, electrical equipment for motor cars, etc.; incorporators, Winfield H. Cameron, J. H. Gugler and Chester B. Pierce.

Milwaukee, Wis.—Wisconsin Tool & Supply Co.; capital stock, $20,000; incorporators, E. B. Arnold, John S. Stover and John W. Mapel.

Milwaukee, Wis.—The Kor-Ker Puncture Cure Co.; capital stock, $14,000; incorporators, Hugo Pietsch, W. R. Gragg and Walter P. Graap.

Milwaukee, Wis.—Auto Mart Motor Sales Co.; capital stock, $20,000; to deal in new and used cars, retail Fords, etc.; incorporators, Israel Lazarus, S. Glicksman and Gottfried Glicksman.

Milwaukee, Wis.—Black & White Cab Co.; capital stock, $25,000; incorporators, Frank Mulkern, Frank X. Boden and Helen H. Mulkern.

Newark, N. J.—Foley Motor Car Co.; capital stock, $25,000; to manufacture motor cars and parts; incorporators, E. J. and F. P. Foley and Peter A. Bannigan.

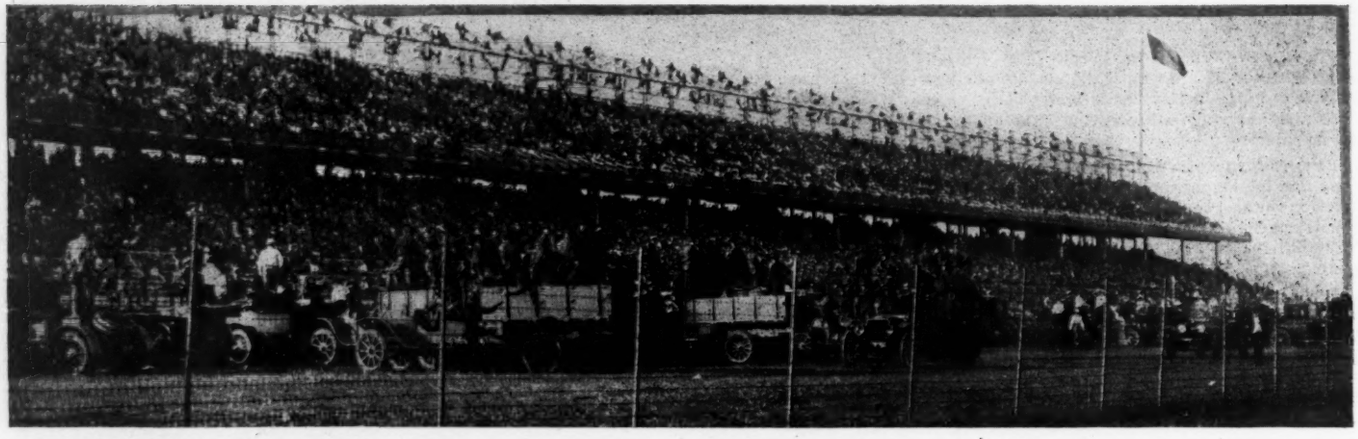
Oshkosh, Wis.—The Oshkosh Foundry Co.; capital stock, $10,000; incorporators, Joseph W. Radl, Frank T. Turner and Hugo M. Stueck.

Springfield, Mass.—Steam Motors Co.; capital stock, $25,000; incorporators, E. F. Gebhardt, Jr., Irving B Hitchings and Wm. J. A. London.

Toledo, Ohio—J. & J. Auto Top Co.; capital stock, $10,000; to manufacture motor cars tops; incorporators, John P. Kams, John R. Galpin, Edgar V. Kams, August Scherff and Alpheus M. Kern.

Waukesha, Wis.—The Safety Truck Brake Co.; capital stock, $20,000; incorporators, W. S. Halladay, J. T. Abel and Elmer L. Arnold.

From the Four Winds



"VERY MUCH ALIVE, THANK YOU!" SAYS MR. RACING TO MR. PUBLIC—The time has not yet come for the curtain on speedway racing, judging from this crowd snapped at Sheepshead Bay when the gate receipts were $75,000. Such a gathering makes any valedictory seem "greatly exaggerated"

MOTOR Show at Fair—There will be a showing of models of motor cars at the Michigan state fair, which begins Aug. 31 and extends for one week. Racing and aviation programs will be arranged for Sept. 1 and 2.

K. C. Club Arranges Shooting Match—The Automobile Club of Kansas City is arranging a registered tournament which will be given under the auspices of the Automobile Gun Club of Kansas City Sept. 3 at the Automobile Country Club grounds. Motor car transportation will be furnished visitors from the grounds.

Vancouver Cars Increase—Between January and July of this year Vancouver collected $57,251.50 in motor car licenses, as compared to $44,107.50 during the same period last year. This is equivalent to a gain of 650 new cars, assuming that none of the old licenses was relinquished. The end of the year is expected to show an increase of not less than $25,000 over the fees of last year.

Pennsylvania Makes Road Maps—The Pennsylvania State highway department has completed a map of Adams county, on which are designated earth roads, improved roads, state highways, state-aid roads, etc. Maps of the several other counties of the state have been made or are now in the course of completion. These maps are found to aid motorists especially.

Farmers' Cars in Pennsylvania Double—A year ago 22,000 farmers in the state of Pennsylvania were using cars for business and pleasure. Now the number has increased 50 per cent, the total being about 33,000. This is about 14 per cent of the total car owners of the state. About 976 trucks are in use on farms in the 700 townships from which reports were available, and at this rate about 2100 are in use on farms in the state.

184 Mountain Miles in One Day—Out in northern California Premier owners are boasting of a 184-mile run made by J. W. Leavitt, Premier distributer, over some of the steepest mountain roads of the state in one day. The route was from Sausalito up the state highway to Santa Rosa and over the mountains to Guerneville, 74 miles, then through Duncan's Mills, Markham's to the coast and northwest to Stewart's Point. Coming back through Noble to Skaggs Springs. The Premier crossed three ranges of mountains in 22 miles and in exactly 2 hr. From the time the car left Guerneville until it passed Skaggs Springs there was practically no straight road. Some of the old wagon grades passed are said to be the steepest found on the Pacific coast.

How Hull, Mass., Makes Driving Safe—Hull, Mass., the town that has within its borders the famous Nantasket Beach, has adopted two measures of safety worth noting. At one point where there is a dangerous right-angle turn with a big telephone pole that has wrecked many cars and motorcycles the pole is painted a bright white from top to base and it stands out like a sentinel. On Atlantic Hill, where a motor traffic policeman stands to direct drivers, the policeman sometimes was in a shadow and could not make his signals clear. This was remedied by placing a searchlight on the hill.

Coming Motor Events

CONTESTS

Sept.	3—Chicago speedway.
Sept.	3—Uniontown, Pa., speedway race.
Sept.	6—Red Bank, N. J., track race.
*Sept.	15—Providence, R. I., speedway race, championship.
Sept.	22—Chicago speedway race.
Sept.	28—Trenton, N. J., track race.
*Sept.	29—New York speedway race, championship.
Oct.	6—Danbury, Conn., track race.
Oct.	6—Uniontown, Pa., speedway race.
Oct.	15—Richmond, Va., track race.
*Oct.	13—Chicago speedway race, championship.
Oct.	27—New York speedway race.

*A. A. A. championship award event.

MEETINGS

Sept. 12-14	—Atlantic City, N. J., Motor and Accessory Manufacturers, mid-season meeting.
Oct. 9-11	—Pittsburgh, Pa., National Association of Purchasing Agents, annual congress.

SHOWS

Sept. 2-9	—Spokane, Wash., Interstate fair.
Sept. 9-15	—Milwaukee show, State Park fair, West Allis, Wis.
Sept. 17-24	—Grand Rapids, Mich.
Sept. 22-29	—Chicago, Ford accessories.
Oct. 1-6	—Buffalo, N. Y., closed cars.
Oct. 13-28	—Dallas, Tex., state fair.
Nov. 12-18	—Denver.
Jan. 5-12	—New York.
Jan. 19-26	—Montreal, Canada.

Plank Quits Baseball for Garage—Eddie Plank, veteran baseball pitcher and a member of the St. Louis Browns, has quit baseball for the present season to engage with his brother, Ira D. Plank, in the garage business at Gettysburg.

Hayes Wheel Gives Employees Picnic—The Hayes Wheel Co., Jackson, Mich., gave a picnic to its employees and their families, which was attended by more than 5000 persons. The program included sports and other entertainments.

Reo Closes for Annual Picnic—The Reo Motor Car Co. closed its plant all day for the annual Reo outing, which was held Aug. 18. This year 20,000 employees and visitors attended. The company extended a general invitation to Lansing folks and to residents of the near by rural districts.

Denver Chooses Show Dates—A motor car and accessory show in the Denver Auditorium has been definitely decided on for Nov. 12 to 18 by the Automobile Trades Association of Colorado. This will be the second fall show in the territory and the first independent motor event here at this season of the year. The other was held by the trades body two years ago with the National Farm Congress and Exposition. It will also be Denver's second show for 1917, a successful event having been held last winter by private promoters.

Pennsylvania Has Licensed 368,275—Pennsylvania licensed 368,275 motor vehicles between Jan. 1 and July 1 this year, an increase of 42 per cent over the same period a year ago, which broke records, and the receipts were $2,913,837, a gain of 43 per cent over the same period of 1916. The biggest jump is shown in pneumatic-tired vehicles, which number 251,788 and brought in almost $2,500,000. There are more than 14,000 trucks. There were 1260 more dealers added to the list for 1917 so far than all last year. This gives a total of 7482, while all last year only 6222 were listed. The number of tractors owned by farmers in the state is 1302. More than 53000 chauffeurs have been licensed, a gain of 14,000.